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A Lawyer's View of Vital Statistics*

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BECAUSE of the width of the subject matter and the diversity in the law of our 48 states, it will be obviously impossible for this paper to convey to any hearer any legal information of immediate practical utility in the occupation of the vital statistician.

Rather than to make dogmatic statements about the legal rules governing vital statistics, the objective will be to outline the relevant legal problems as they appear to one who is a lawyer and also a teacher of law school subjects particularly germane to the field of vital statistics.

Immediately the problem of emphasis or of relative importance is raised. For where to the professional vital statistician one topic may be far more important than another, the reverse may be true, or equal importance may be attached, where the lawyer is concerned. Thus, for instance, the lawyer may be equally interested in birth and death certificates, while the professional vital statistician may find that the former is a far more interesting and relevant matter and one which raises more frequent problems in his daily task. The lawyer may also be as interested in the proof of the facts of marriage, divorce, adoption, and legitimation, although these are frequently handled by other than professional vital statisticians as incidents of the regular task of recording court proceedings.

Then, too, the lawyer visualizes the central problem of vital statistics as that of getting a certified copy admitted in evidence, where the professional vital statistician may treat that as but one item in the larger picture of the general use of certified copies (or other records) by courts, other governmental agencies, insurance companies, employers, public schools, and others. The courts may set one standard for admitting records in evidence—other agencies may quite willingly take records not meeting judicial standards. There is no reason why this should not be so.

Thus let us define the lawyer's outlook on vital statistics as follows: The problem is that of securing evidence concerning facts of human pedigree, *viz.*, the physical events of birth and

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death, the relational facts incidental to birth of paternity and maternity, and the further relational facts of marriage and divorce, adoption, and the legitimation of those born illegitimate.

To a lawyer all are important because it may become necessary to prove them in his practice in order to determine the devolution of property or the solution of domestic relations problems or the prosecution and defense of persons accused of crime.

The remainder of this paper will be devoted to a statement of the legal problems of vital statistics as they appear to a lawyer, under the following heads: (1) administrative problems; (2) the admissibility of records in evidence; and (3) a separate treatment of the legal and evidential implications of legitimacy—a problem which has recently become important both for vital statistics and for social work generally.

I. Administrative Problems

The name used for the first topic, for want of a readier one, is "Administrative Problems," *viz.*, the legal matters which the professional vital statistician encounters in his daily functioning in preparing vital statistics and before any question arises of their admissibility in evidence.

The professional vital statistician is a government official whose office is created by law and whose duties are regulated by law. Hence there are presented to him in his routine work legal problems herein called administrative problems. I shall classify these problems under three heads, roughly approximating the three types of government records which are recognized by the law of evidence. These types of records are: (1) *registers* prepared by actual or quasi-government officials of events occurring within their cognizance; (2) *returns* collected by officials of information submitted to them by other officials or private persons; and (3) *certificates* issued by government officials to private persons attesting the happening of certain events or the contents of original records on file.

The task of the vital statistician covers all three of these stages and problems arise at each. Typically the process of vital statistics includes the recording by one having actual knowledge of an event (doctor, midwife, undertaker); the return of such information to the registrar; and the issuance by the registrar of certified copies (or less formal certificates) for legitimate use by others. It is proposed to mention typical problems arising at each stage as follows: (1) what to put in the original record; (2) what to receive; and (3) what to issue.

1. *What to put in the record*

While the matter of what information the original entrant should put in the record is largely regulated by varying local statutes, yet there is one aspect of it common to the whole American legal system and which may raise a problem for any type of record and in any state. This is the question as to the entrant's making a record of a fact not actually known to him but which was related to him by someone at the scene of the relevant event. A typical example of this would be the attending physician's entry—in a birth certificate—of what he was told concerning the name of the father and the fact of his marriage to the mother —facts hardly likely of being within the purview of the physician's actual knowledge.

Lacking a clear-cut statutory mandate to allow it, grave doubt is presented, legally, as to the admissibility in evidence (or the propriety of the registrar's accepting) of a record which purports to relate facts other than those occurring within the knowledge of the

original entrant. This is because of the law's distrust of hearsay, which we will see when the hearsay rule will be discussed farther along.

2. *What to receive*

Here again the question is largely governed by locally applicable statutes. Obviously the registrar should not receive a record which flagrantly departs from the statutory mandate governing the particular record. Yet insignificant imperfections are inevitable, either by way of omission or of commission. Some records lack detail commanded by statute, others contain material not provided for. How much of this sort of material is to be received is more often determined by departmental practice than by judicial rulings. The latter are difficult to obtain and are rarely obtained, either because the point is infrequently raised when the records are offered in evidence, or because a direct attack on the problem by mandamus or injunction against the registrar is unusual.

One aspect of this which is currently mooted is that of belated registration, *viz.*, should the registrar accept a record presented to him more than the statutory period after the happening of the event reported? If, for instance, the statute provides that physician or midwife shall report a birth within 20 days, may the registrar accept a report presented after that period?

Solution of this is usually made by the state attorney general or some other legal adviser. The two possible, and opposite solutions are: (1) that the registrar may not accept such a report because the period was meant to apply to him as well as to the reporting person; and (2) that he may receive it as the period was set up only to impose a duty on the one making out the record, and to provide the threat of a penalty to encourage promptness.

Common sense, and justice to the individuals concerned would seem to dictate the latter result, and yet the former has some support when we consider the general legal problem of the hearsay rule and of the exceptions thereto which cover vital statistics. One thing which makes vital statistics generally admissible by way of exception to the hearsay rule is that government records are more than normally trustworthy as evidence because they are prepared while the knowledge is still fresh in the minds of the entrant, so that inaccuracy due to forgetting is largely eliminated. Belated registration, on the other hand, involves the record being prepared long after the happening of the event when the lapse of time indicates less than normal accuracy.

Perhaps the best solution would be to permit belated registration but to require clear-cut indication of that quality on both original and copies so that all persons called on to use them might be on guard against being deceived by any inaccuracy resulting from the lapse of time between the event and its being recorded.

3. *What to issue*

Assuming the propriety of the original record and the version of it found in the registrar's files, the third type administrative problem is under what circumstances and to whom the registrar should issue copies of his records. The problem arises most frequently in connection with birth certificates showing the embarrassing fact of illegitimacy. Many registrars are reluctant to issue such certificates save to the individuals concerned or upon a court order. What are the legal aspects of the problem?

There are two conflicting legal policies involved. One is that of publicity — that governmental records should be open to all the public. This is one of the factors which make for

the general trustworthiness of public records, that mistakes will be unlikely because public inspection will show them up and cause them to be corrected. Under this policy it should be the duty of registrars to issue birth certificates of anyone to anyone. However, it is unlikely that anyone not really entitled to such certificates would take the trouble to institute appropriate legal proceedings to compel such issuance, and so it is that many registrars commendably refuse to issue such certificates to those who may wish to make improper use of them.

Opposed to the policy of publicity is that of privilege—frequently recognized in the law of evidence—occasionally with reference to public records. Thus, confidential statements between spouses are privileged, in order to foster the marital relation. Secrets of state, and testimony before a grand jury are privileged for the better functioning of the government agencies involved. Statements of client to lawyer, or of patient to physician are frequently protected. All of these rules suggest that there could well be added a more clearly defined statutory sanction for the privileging of such types of vital statistics records as need the protection.

II. Admissibility of Records in Evidence

While, no doubt, to the professional vital statistician the "administrative problems" just mentioned will bulk the larger, yet to the lawyer these are less significant, legally speaking, than the one now to be treated—the admissibility of records in evidence in judicial proceedings—a problem which appears sooner to a lawyer, particularly if he be a trial lawyer, under the rules of evidence.

While there are other rules that vital statistics encounter in the law of evidence, yet the hurdles they present are easily surmounted and there is left one rule—a large and important one—that gives us the principal body of problems that are raised by vital statistics when they are offered in judicial evidence. That rule is the hearsay rule.

The General Hearsay Problem

Put bluntly, the hearsay rule forbids X to give testimony of what Y told him and rather limits the testimony of witness X to that which X himself knows and remembers and requires that X narrate this in open court, under oath and cross-examination. So X cannot tell what Y told him for X does not know that himself, and the narration of Y, who does have the knowledge, is not given in the proper manner.

The law of evidence—in an effort to guard against erroneous jury verdicts resulting from untrained jurors being deceived by inaccurate evidence—has assumed that human narration is, generally speaking, untrustworthy and only becomes sufficiently trustworthy when limited to actual human knowledge and recollection which is narrated in a manner calculated to guard against error. So hearsay is forbidden because it is not the recollected knowledge of the one who is properly narrating and was not properly narrated by the one who did have the knowledge.

Official records kept by vital statisticians are hearsay and, save for the exceptions to the hearsay rule presently to be discussed, would be barred from judicial evidence. Should an original birth certificate be offered in evidence, for instance, with the doctor not present in court, proof of it would merely be proof by X (the authenticating witness) of what Y (the doctor) had said (in writing) out of court about the fact of birth. Should a certified copy of the same certificate be offered, it would be hearsay on hearsay, *viz.*, the registrar's out of court statement about the doctor's similarly forbidden

statement. But there are many recognized exceptions to the hearsay rule, several of which are relevant for vital statistics.

EXCEPTIONS TO THE HEARSAY RULE

The hearsay rule is most famous for its exceptions. These serve out the policy of the rule by recognizing selected types of human utterances which are intrinsically so trustworthy that they may safely be admitted in evidence without the usual safeguards required for the conditioning of normally untrustworthy evidence. They recognize qualities in the contained narration which tend to make it free from the usual dangers calling for oath, cross-examination, and narration in the presence of the fact-finder. These factors include unusual absence of motive to falsify, presence of motive for accuracy, and that the facts are of a sort easily perceived without mistake, easily remembered, usually for but a brief time before narration, and simply narrated without chance for mistake in phraseology.

Vital statistics possess qualities of these kinds and so it is that official records of the vital statistics kind involve at least three of the many recognized exceptions to the hearsay rule. These are the exceptions for pedigree, business records, and government records.

1. *Pedigree statements*

This exception covers part of what I shall later treat as " primitive " forms of vital statistics. It permits proof, by way of departure from the hearsay rule of any statement made out of court by one concerning facts of his " pedigree," *viz.*, facts and dates of paternity, maternity, birth, death, marriage, divorce, adoption, and legitimation—which facts are those that the lawyer visualizes as the bailiwick of vital statistics.

The theory is that narration of such facts is more than usually trustworthy because the speaker's knowledge of the fact is more likely to be accurate (one's own family history), that the danger of error because of lapse of time between event and narration will be offset by the probability of family discussion of the fact, and that narration can be made in simple terms not likely to cause error in understanding. Motivation to falsify is little likely for pedigree facts.

This exception probably antedates the others in providing primitive forms of vital statistics and ready means of proof of the facts contained therein. It is the rule which admits proof of a person's own statement as to what his name is—or when he was born. One's statements about his own immediate pedigree as much meet the exception as his statements about the marriage of a remote ancestor, or the details of the relationships of his cousins.

2. *Business Records*

The second exception is that for regularly kept business records. Such records constitute hearsay—as the " out of court " statement of the person making the entry concerning the item entered—and would be excluded were it not for the exception for them which recognizes the extraordinary trustworthiness of their content which justifies dispensing with the usual requirements.

The theory of the exception is that the content of business records is narration of a very trustworthy sort, so much so that there is no need of oath, cross-examination, and narration in court. There is believed to be usually little motive for a bookkeeper to make a false statement, and, in fact, the circumstances of employment, duty to superior, fear of censure, inertia of routine, all tend in the direction of willed accuracy. Accuracy of perception is more than usually likely because

of attention to duty; the time interval between perception and narration is usually so short that defects of memory are avoided; and the content of the fact narrated is so simple that errors in narration by inept choice of words are at a minimum. So it is that today regularly kept business records are admissible by way of departure from the hearsay rule. This exception does cover one form of vital statistics record—later to be classed as "primitive"—*i.e.*, the baptismal record of a church.

3. *Government records*

This exception to the hearsay rule is the one that squarely covers the use of vital statistics records in evidence. To the layman it might seem that there should be but one rule for both business and government records. For the keeping of official records is, after all, but a business. Analytically speaking, there is but one rule (or one exception to the hearsay rule) with but a single rationale. The explanation of their separateness is historical—they had separate origins and only recently have the respective rules so been modernized as to present the same appearance when their historical antecedents are ignored.

All that was said concerning the second exception (business records) can be reiterated to justify the quality for trustworthiness of government records that allows of their being offered in evidence despite the hearsay rule. Briefly, there is the same absence of motive to falsify, presence of motive for accuracy, duty, fear of censure, inertia, likelihood of accurate perception, brief recollection, and simple narration when a government official keeps a record of an event occurring within his knowledge. An added factor peculiar to public records is the usual public examination of the records—itself a voucher of trustworthiness.

Vital statistics records come squarely within this exception. All three types, the record of events occurring within the official's cognizance, the returns to a central agency of reports prepared by scattered officials, quasi-officials, and private persons, and the certified copy issued by the official to interested private persons make their appearance.

TYPES OF VITAL STATISTICS RECORDS, PRIMITIVE AND MODERN, WHICH THE LAWYER HAS OCCASION TO ENCOUNTER

Having outlined abstractly the legal rules which govern the admissibility of vital statistics records in evidence, it is now proposed to mention briefly the types of vital statistics records which the lawyer has occasion to encounter, primarily for use in the courtroom, occasionally for other purposes in convincing officials or others of the facts contained. One might roughly classify these into two groups, called "primitive" vital statistics, and modern ones.

The primitive types of vital statistics are those which are rendered admissible by the pedigree and business record exceptions to the hearsay rule. They include family bibles, gravestones, family genealogical charts, and baptismal records. Just as would be admissible proper proof of some one's having made an oral statement concerning his pedigree, so it is that the statements in writing in bibles, on gravestones, and on genealogical charts will come in. If proof is made that the bible is the one customarily kept in the family about which the entry speaks, no proof need be made as to whose handwriting the entry is in, for it will be taken that it was in the handwriting of some one whose statement, written or oral, would be acceptable under the pedigree exception. That a certain statement appears on a gravestone in a family lot is taken as the indubitable statement of some member of the family—qualified to speak—of the genealogical fact con-

tained therein. So it is with a genealogical chart found in the possession of some one of the family about which it speaks.

Church baptismal records, admissible legally through the business records exception to the hearsay rule, have been in use longer than centrally kept birth certificates. While they speak certainly only of the fact of baptism, rather than the fact of birth, yet even this may be valuable to a lawyer if he can win his case merely by proving the child to have been alive on a certain date (that of baptism) regardless of the exact day on which the birth occurred. Frequently this will suffice. Some jurisdictions might even admit the baptismal certificate to prove the date of birth noted thereon, on the theory that it was a record of the parents' properly admissible statement as to the fact of birth, itself justified by the pedigree exception.

Modern types of vital statistics might be grouped into three classes: (1) the records of miscellaneous officials, neither court clerks nor professional vital statisticians, kept for other purposes than vital statistics, yet which, on occasion, prove valuable to a lawyer in proving pedigree facts; (2) records kept by court clerks of a vital statistics nature; and, (3) regular vital statistics records kept by professional registrars in central record offices.

The first class is the vaguest. Typical examples would include the use of public school records to prove age and paternity, or an application for an automobile operator's permit to prove age or residence. The facts of age, paternity, marital status, all frequently appear on the records of miscellaneous government officials kept primarily for other purposes than as vital statistics records. Frequently the use of these can be justified in evidence under the usual government record rule. Not infrequently they are sought to be used under still another departure from the hearsay rule, as the admission of a party litigant. If, for instance, one gives on an application for a driver's license a different age than that alleged in a suit of law, his opponent will wish to offer proof of the application against him as a party-opponent's admission.

The second class offers records with which the average lawyer is most familiar, for he actually encounters them in his almost daily trips to the clerk's office of the court in which he practises. There along with routine court proceedings, records of land transfers and property mortgages, conditional sale contracts and judgment liens he finds an important group of vital statistics, *viz.*, records of marriages and divorces, and adoption proceedings. Records of courts in filiation or bastardy proceedings would also fall in this group. Divorce and adoption records are kept in court clerk's offices because they are incidental to the litigation accomplishing these ends. There is no particular reason for marriage license records to be kept there, save that court clerks have customarily been given the function of issuing various licenses, marriage, dog, fishing, and hunting, and so that important branch of vital statistics is assigned to them. Not infrequently transcripts of such vital statistics are made by the court clerks and returned to central vital statistics offices for safe-keeping.

Finally, the lawyer encounters the third class, that with which the professional vital statistician is most familiar, *viz.*, records kept by registrars in central record offices which exist for no other purposes than to keep records of vital statistics. These offices may serve a whole state, or a small geographical subdivision thereof, such as a county or city. I would include the records of the Bureau of the Census at Washington in this category, particularly as today their records are

coming more and more into use, particularly with reference to Social Security practices.

Frequently these offices are themselves offshoots of other state agencies —most usually a state department of health. The average lawyer would probably be curious to know whether registrars of vital statistics are quartered with health departments because the subject of vital statistics is naturally a component part of the science of public health; or vital statistics is a part of that science—and of its professional organizations—because the lawmakers have decreed that departments of public health shall handle vital statistics. No doubt the emphasis which the vital statistician puts on birth and death records, to the exclusion of marriage, divorce, and adoption records, is because of the fact that the former are concerned with health while the latter are not. Thus it is that this part of the paper can be ended in the thought with which it started, *viz.*, that the lawyer and the professional vital statistician attach different emphasis to the different types of vital statistics.

III. Legitimacy

A topic which recently has seemed important, in vital statistics, in social work, and in the law generally, is that of legitimacy. The vital statistician is faced with the problem of avoiding a showing of the embarrassing fact of illegitimacy on the birth certificate. The status of the illegitimate child in receiving relief bothers the social worker. The capacity of the illegitimate child to recover for wrongful death of the parent, or of the parent for the death of the child, is of importance to the lawyer who handles personal injury and wrongful death cases.

What is legitimacy—viewed from the standpoint of vital statistician, social worker, and lawyer? It is a legal concept, not a physical matter. Legitimate people do not wear different clothes, nor present different physical features from illegitimate ones. Furthermore, as a legal concept, it does not affect the individual standing alone. An illegitimate person can vote, own property, marry, drive a car, and do anything that a legitimate one may do. The quality of legitimacy is, legally, a relational one, *viz.*, it affects the legal nature of the relations between the individual in question and others. Being legitimate is really important in law only if one wishes to inherit from a propertied relative who forgot to make a will, or to collect damages for the injury to or the death of a relative, or to claim property left to a group in one family. Inasmuch as legitimacy is relational, the fact comes within the ken of vital statistics as the lawyer views it, *viz.*, proof of pedigree, *i.e.*, human relationships.

Even if one be born illegitimate, still he may acquire the status of legitimacy by subsequent activity of his parents. This is called legitimation. In a very few jurisdictions provision is made for official proceedings to accomplish it and where this is so, official records will be available. In most jurisdictions it is accomplished by the marriage of the parents and/or the father's recognition of the child as his own. When this is so, the only vital statistics records available will be those of the marriage. The fact of recognition will have to be proved informally.

In the light of the legal rules governing the establishment of the quality of legitimacy in court, that quality might be defined as follows: being born to a woman who, at any time during the preceding 9 months had a living husband, it being impossible to produce sufficient proof that the husband was not the father of the child. For the law recognizes the obvious difficulty

of being sure of paternity—as distinguished from maternity—and solves the dilemma by a presumption that the husband is the father, unless clear-cut evidence to the contrary establishes that he could not possibly have been the father. This is the so-called "presumption of legitimacy" which is the legal device for establishing legitimacy. This presumption may not be rebutted merely by showing that some other man might have been the father, for if the husband might have been, in law he is.

The modern tendency has been to ameliorate the legal disabilities of illegitimacy, few though they be. Statutes have been passed allowing illegitimates to inherit from more people; proof of subsequent legitimation may be more easily made under the statutes of some jurisdictions; and statutes have been passed allowing illegitimates to recover as members of the families of their parents, and *vice versa*.

To the vital statistician, no doubt, the most pressing problem in this trend is how to avoid the showing of the embarrassing fact of illegitimacy on the birth certificate of an illegitimate person. The suggestion is here made that, though desirable, it is impossible of achievement without a thorough revamping of the nature of birth certificates that will never win the approval of vital statisticians and legislators.

For it will not solve the problem merely to delete from the birth certificate the parts where should be indicated "legitimate or illegitimate" or "father and mother married or unmarried." There is still left the problem of names. If the father's name differs from the mother's that normally indicates the illegitimacy of the off-spring (with all due apologies to the Lucy Stone league). If the mother's different name be treated as her maiden name, there is still the problem of what name to give the child. If the same last name as the father's, and the child is raised in the mother's family, it will probably be called by the last name of that family, and the certificate name will vary from the normal one used by the child—itself an indication of something wrong. If the child be given the mother's name on the certificate, the difference from the father's will indicate illegitimacy.

To the writer's mind, the only possible solution of the dilemma is one that will probably never be adopted, *viz.*, to make no mention on the birth certificate of either the father's name or the mother's marital status, to give the child the last name by which the mother currently goes, with no reference to whether it is the maiden or married name. This will avoid any suspicion of illegitimacy and yet enable the child to have a certificate in the name by which he will be reared, whether it be father's or mother's maiden one. This has the disadvantage of depriving the birth certificate of its utility in proving the facts of paternity and marriage of parents, if any. It is a question whether it is worth while to deprive legitimate children of this type of record so as to avoid embarrassment to illegitimate ones.

Somewhat the same problem is raised in the parallel situation of issuing a new birth certificate to adopted children which will not show that they are adopted. Time does not permit going into this but it should be obvious that the difficulties are somewhat similar. One thing to keep in mind is that an adopted child still sustains some legal relations with the natural parents, just as an illegitimate one has a certain, though slim, legal claim on the father.

What Is a Delayed Certificate and Under What Conditions and Requirements Should It Be Filed?*

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BECAUSE of the rapid growth of our country, it is only within relatively recent years that many of the states with large rural populations, and in some cases with the people thinly scattered over wide areas, have been able to establish and enforce an adequate system of birth registration. In 1915 only 10 states had systems sufficiently complete to admit them to the registration area. Even today there are a large number of people living in places difficult of access to whom children are born without other medical attention than from some member of the family, and because of their isolation these people are often not aware of the importance of registration. Yet as conditions of communication improve many of these children will go out to work where birth certificates are required, or other occasions will arise where they will be needed and of course no certificate will be on record. Then there will always be, I fear, the problem of the doctor or midwife who will fail through carelessness, to register births.

I need not mention the many purposes for which birth certificates are required or desirable, as the recent publicity which has rightly been given to this matter has probably made you all familiar with them. However, within the last year or so this need has been greatly augmented by the Social Security Legislation of the various states.

To obtain some permanent record at a later date of these unrecorded births is not merely of academic importance in making our state records complete, but is of importance for several other reasons. In the first place, more than one occasion is likely to arise when evidence of date or place of birth will be required, and if this proof is definitely on file in the form of a birth certificate, it will not be necessary to produce the various affidavits and other evidence on every occasion. Furthermore, having once established a certain date and place of birth it will not be possible on some future occasion to introduce other evidence perhaps, of a false nature, to support a claim to a different set of circumstances. It will also make available a record at the place where anyone seeking information will first turn, namely the state registration office. Finally, records will be available for future generations seeking genealogical information.

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Since the information desired would be in most cases similar to that on a certificate of birth filed on time, the form used for such registration should be very much like any standard certificate of birth. It is usually desirable, however, to be able to distinguish these certificates from those registered on time, and for that reason a separate form is most commonly used as well as to facilitate the carrying out of various regulations regarding its filing.

Whatever form of certificate is used for these births occurring during some year previous to the one in which it is registered, the certificate is known as a "delayed certificate," and the act of registering it a "delayed birth registration." The term "delayed birth certificate," is, however, often used to denote a special form on which such births are registered.

It is quite possible in the case of older children or adults that the person who attended the birth and should have made out the certificate is dead, or for some other reason is no longer capable of making out a true certificate. In such cases it becomes necessary to have a parent or some older member of the family acquainted with the circumstances fill out the certificate. As they, or even the regular attendant when available may have to rely largely on memory, there is grave danger that he or she may be careless as to the exact facts, or even if some matter of financial importance is involved deliberately falsify. To meet this danger it is necessary to have some rules regulating the conditions under which the certificate is to be accepted, if it is to have any real value.

At the present time the law and regulations in various states differ widely, and it is a little doubtful whether or not a standardized procedure could be adopted satisfactory to all these conditions. Nevertheless, if possible, such standardization is desirable so that the value of delayed certificates will be more or less equal no matter where the state in which they may be registered.

In those states where registration has been compulsory for a long time, and the law strictly enforced, the number of unrecorded births will be relatively small, and it is possible to adopt very strict regulations governing the filing of a delayed certificate. In other states where an adequate system of registration has only been recently put into effect or where conditions are such that many children are delivered by persons ignorant of the law regarding registration, the number of delayed certificates received will be large, and too rigid regulations might present a real hardship to those concerned.

In making any regulations governing the conditions necessary for the acceptance of a delayed certificate we must bear in mind certain major considerations.

First, if our state records are to have the value that they should, and our office to have the confidence and respect of the people with whom we deal, we must safeguard the truth of our records. Second, we should wish our records to be as complete as possible. Then we have an obligation to the persons who wish to put a record of birth on file to make our regulations such that they will not interpose almost insurmountable obstacles, financial or otherwise. Finally we must protect the interests of those who may accept our records as evidence for settling claims or making other legal determination.

In some of our states there is a fee required for registering delayed certificates. I realize that there may be something to be said in favor of this in so far as it makes the person registering conscious of its importance, and there is furthermore the thought

that to avoid being obliged to pay this fee people may give more attention to having births registered on time. Personally I do not favor the idea. In the first place one of our principal objects should be to make our state records as complete as possible; to impose any large fee for late registration will considerably limit this objective, especially as a large proportion of those who have not been registered on time are the ones who can least afford to pay such a fee. It does not in reality assist in any way to make the certificates more correct, and persons wishing to file a false certificate for some dishonest motive will not be deterred. Such a fee has somewhat the appearance of a fine for failing to register on time, but a fine which is in most cases paid by the injured party rather than by the person responsible, that is, the attendant.

One idea, however, which does seem to me to possess merit, is to have a definite and fairly large fine for placing a false statement on a certificate. I also think it is a good practice to have the statement that there is such a fine printed on the certificate in such a way as to attract the attention of whoever signs it, as is done in some states. While of course the person making a false affidavit could be prosecuted for perjury, we have been advised against prosecution by the attorney general's office, in one or two cases, because of the difficulty in proving that the false statement was intentional.

The regulations for filing these certificates in use in our state is at the present time the one most generally employed, but it seems to me dangerously inadequate. Any person present at the time of birth and familiar with all the circumstances may fill out the delayed birth certificate for which we have a special form, on the back of which he makes an affidavit properly notarized that the facts stated are true. When we receive the certificate our records are only checked for that year and perhaps the year immediately before or after the year of birth. This is primarily to prevent duplication.

We have been fortunate in that no case has yet come to our notice of our having accepted and filed any certificate containing an intentional or notable falsehood. I often fear, however, that the significance lies only in the fact that they have not come to our notice. We all know how little a sworn statement means to many people, if by a false oath they can obtain money or other advantages. The amount of care taken by the notaries before whom the affidavits are made can be illustrated by our own experience. On one occasion someone came to our office to ask us to help him fill in the face of his certificate, which he had not yet done, but the affidavit on the back had been duly sworn to and notarized.

Another method which is more effective is to have the person appear before a judge of a circuit court to register his birth and present what evidence he is able. There is much to be said in favor of this method, but again there is the objection that it necessitates a fee which may seem very large to the person registering yet is in reality not large enough to cause the judge to look upon it as other than a nuisance. An alternative method is to have the certificate filed with the local registrar who examines the evidence and determines its correctness. So far as West Virginia is concerned, I doubt if this method would be very effective, unless the local registrar were personally acquainted with the applicant. I further doubt if all of them are capable of passing judgment on the evidence presented.

The state registrar does of course have a certain amount of discretionary powers regarding the acceptance of a

certificate, but it is my feeling that his determination should be based so far as possible on definite regulations, since merely arbitrary decisions may not always be fair, at least give opportunity for an accusation of unfairness, and may furthermore create dissatisfaction.

Of course some such method of inspection of certificates must be used I suppose where there are no laws or regulations governing the registrations of these delayed certificates if they are to have more than a very dubious value. In states such as ours there is no law whatever governing the acceptance of these certificates and their control is entirely a matter of regulations.

We have, like several other states, been accepting delayed certificates on the ordinary form when signed by a physician.

We recently, however, made a ruling which has not yet been enforced, that such certificates will only be accepted for births occurring 2 years or less before the date of registering. If a longer time has elapsed they must also be notarized unless the physician can write upon the certificate that the information is taken from his records made at or shortly after the time of birth.

In my own opinion the regulation that seems best to me requires an affidavit by the person making the certificate, as in our method, but in addition requires the presentation of suitable supporting evidence. In the absence of such supporting evidence the affidavits of 2 American citizens, not related to the person for whom the certificate is intended, and who were fully acquainted with the circumstances of the birth, are required.

Acceptable supporting evidence would be baptismal records, the records in the family bible, age given at school or possibly at time of marriage or on any occasion of a legal or similar nature. Provision should be made for the state registrar or his representative recording such evidence and returning the original record, sent in support, if so requested.

I believe it is better to have the affidavits and record of evidence written on the certificate itself, to avoid danger of loss, but if for any legal or other reason this is not suitable, any method of filing which would make the information readily available would be satisfactory.

I have said nothing as yet regarding delayed death certificates. They are similar by definition, in as much as they are certificates for deaths occurring in any year previous to the one in which they are registered. Up to the time of writing this article we had been asked on only two occasions to receive such certificates. The request to file them has been so rare that very few states have any fixed regulations regarding their filing so far as I know.

However, since beginning the writing of this paper I have been informed that the Department of Public Assistance has found several deaths to have occurred without death certificates having been filed. I was absolutely appalled when informed by that department that the number of unrecorded deaths found by them would probably exceed the number of unrecorded births and would run into hundreds.

Faced with this problem I have made the following provisional rulings:

When a certificate is signed by the informant, undertaker, and physician, we will accept it without requiring further evidence.

When it is signed by the informant and physician, or informant and undertaker, we will also accept it if sent from some responsible source such as the Public Assistance, whose investigators will have presumably made some examination of the circumstances. If not presented through some such source an

affidavit should be required from the informant.

If the death occurred without medical attention and no licensed funeral director had charge of the burial, we propose to require the informant to make affidavit of the truth of the facts given and to produce further evidence in the nature of an affidavit from any minister who performed the ceremony, or of two responsible people not related who know the facts to be true.

We are using the ordinary death certificate form with affidavits attached for the present, but may issue a new form after we have found, if possible, the reactions of this meeting.

Because of the extreme newness of this subject so far as we are concerned, I do not feel justified in going into the matter at any greater length in this paper.

It seems to be generally the case in all states where delayed certificates are accepted, that the certified copies of such have in theory the same legal status as copies of certificates filed on time but that in actual practice a court would consider their true value only such as accorded to the laws and regulations governing their filing. In order, therefore, that the courts may properly evaluate them, it seems to me that it is not sufficient to depend on the date of filing, but that such certified copies should unmistakably state the fact that they are copies of delayed birth certificates. Furthermore, it seems to me desirable that it be stated some place on the certified copy what the nature of the evidence or other matter filed in support may be in order that its value shall not be underestimated.

SUMMARY

A delayed certificate is a certificate for a birth or death occurring a year or more previous to the one in which it is filed.

It is desirable to have as many births and deaths as possible recorded, even though recorded late.

To prevent fraud certain regulations should govern the conditions under which they are accepted.

The value of imposing a fee for late registration is at best doubtful. Some regulations now in force in various places and worthy of consideration individually or collectively are:

An affidavit signed by the person filing a birth certificate that it is true.

A statement that the attendant at birth is unable to sign the certificate.

The production of supporting evidence.

The affidavits of two other persons not members of the family supporting the truth of the statements.

Certified copies of delayed certificates should plainly show that they are such; and it might be advisable to state thereon what evidence was filed in support.

Regulations on delayed death certificates have not been greatly needed until recently, and therefore need further consideration.

Some standardized procedure to equalize the value of delayed certificates in the various states seems advisable.

Medical Care as a Public Health Function*

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THE title assigned me today, "Medical Care as a Public Health Function" would perhaps make a more inclusive appeal to public health officials if it ended not with a period but a question mark. With the traditional task of public health far from completed, with so much yet to be done throughout the country in "leveling up" those preventive services long accepted as a definition of public health functions, it is quite understandable that the first reaction of public health workers to a function directly concerned with individual care should be one of hesitancy. "Better do our familiar and long accepted task well and not get into new controversial fields" is the way I have heard this first reaction expressed. Rarely, however, have I heard this position maintained after a full and open-minded examination of today's facts and conditions which clearly and overwhelmingly reveal that medical care as a public health function is not so much a new function which public health must take on as an extension of the function and services which public health leaders and workers have long claimed as their own and given their lives to advancing. No tribute could be too great to pay to those early scientists and public health officials whose tireless and brilliant efforts and sacrifices won the battles against the scourges, plagues, and epidemics of past years, found the causes for them, and established procedures and practices which have largely freed mankind from their devastation and destruction. As a consequence of the triumphs of science and their application in the health field, we find this startling contrast in mortality data: 50 years ago approximately 94 per cent of all mortality from disease was from acute illness, chiefly infections; today 75 per cent of all mortality from disease is from chronic illness. Three out of 4 of our deaths from disease are caused by 10 diseases. Listed according to the death rates which they are responsible for they are: heart disease, cancer, pneumonia and influenza, cerebral hemorrhage, nephritis, tuberculosis, diabetes, diarrhea and enteritis, appendicitis, and syphilis. All but 3 of these are chronic.

Where do they strike most often and hardest? In the homes of the poor, of that "one-third of our people, ill-fed, ill-housed, ill-clothed." This phrase must be amended by adding, "ill-cared-for, or not cared for at all, in sickness and death."

From 7 of those 10 diseases—all but cerebral hemorrhage, diabetes, and appendicitis—the death rates mount

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steadily as income goes down. The death rate from respiratory tuberculosis is 7 times as great among unskilled workers as among professional workers; it is 3 times as great among the skilled as among the professional. Pneumonia kills 3½ times more unskilled workers than professional; death rates from diarrhea and syphilis are twice as high for the unskilled as for the professional; cancer's toll of the unskilled worker is 50 per cent higher than of the professional. The death rate from all causes is more than twice as high for the unskilled worker as for the professional.

The death rate of babies has been called the most sensitive index of the success of public health effort. It might well be called the best index of whether or not civilization is progressing. More than 20 years ago Children's Bureau Studies revealed the fact that the babies of the poor died at a notably higher rate than the babies of those in comfortable circumstances. While the use of infant welfare services in the last decade has resulted in a marked reduction in the infant mortality rate, large areas still exist in which the mortality of infants of the poor is of the order of rates observed over 20 years ago.

It is highly significant that the causes of infant deaths which have shown the greatest decreases in the past 40 years are the ones which show the largest excess in infant mortality among the low income group. The diseases which kill the babies of the poor in greatest excess are the very ones in which greatest general decrease in infant mortality has taken place. To quote the findings of a most recent study, infants in families with an annual income of less than $500 died at a rate of 168 per 1,000 live births, as contrasted with 30 per 1,000 in families with incomes of $3,000 or more. Between these extremes the infant death rates declined regularly as income increased.

Evidence has long proved that prenatal care is effective in reducing maternal as well as infant mortality. But at present only 30 to 35 per cent of women from low income families receive adequate prenatal care, in contrast with 80 to 85 per cent in the higher income brackets.

You will remember, perhaps, a few years ago the glib phrase heard frequently, "Well, anyway the depression was good for the health." The fact that the general death rate for the nation was slightly less in recent years was taken at face value, as an index to improved health of everybody. The Health and Depression Studies of the U. S. Public Health Service and Milbank Memorial Fund dispelled this illusion. They revealed the fact that the downward trend of mortality rates for the prosperous elements of the population masked the conditions among the unemployed and the lower income groups. It was found that while the death rate during the period 1929–1932 declined in families with full-time employed wage earners, it increased 20 per cent in families with no employed members or only part-time wage earners.

Shocking as these death facts are, revealing the highly disproportionate loss of life in our lower income homes, they are far from the whole picture. For every case of sickness resulting in death there are from 50 to 100 cases which do not die. Disabling disease, with its long drawn out suffering and misery, its day-to-day hopelessness, the want and denials which families undergo as a consequence, exact as cruelly excessive a toll as death in the homes of the poor.

Two years ago, at your Milwaukee meeting, I discussed the National Health Inventory which the U. S. Public Health Service was undertaking as

a Federal Works Progress Administration project, under the direction of Dr. L. R. Thompson, Director of Research, and George Perrott, Chief Statistician of the U. S. Public Health Service. I said at that time:

The objective of the survey is to develop facts that will eventually provide the average man with greater security against the hazards of disabling illness. Modern preventive medicine has made great strides in increasing our security against early death as evidenced by the fact that the expectancy of life has increased from about 40 years in 1870 to 60 years in 1935. This gain has been largely due to the prevention and control of the communicable diseases. It is now proposed to study the causes of chronic illnesses and disabilities which usually appear after middle age and which are so intimately associated with the economic and social status and habits of the people.

The survey is based on national recognition of the fact that the health service of the future will probably be expanded to cover other fields than the control and prevention of the communicable diseases. With the coöperation of the medical profession, the control and prevention and cure of all the ills of the flesh must be the ultimate goal of the health department.

Few of us realize what the presence of a serious or long-standing chronic illness in a household means as to the ability of the family to maintain itself on a self-supporting basis and procure the needed medical care.

Under-privileged families have the greatest need of adequate care because of the high rate of disabling illness and impairment among them. A recent survey made by the Public Health Service in 10 cities showed that the disabling illness rate was 56 per cent higher among families hardest hit by the depression than it was among their more fortunate neighbors, but that these "new poor" received only about one-half the volume of physician's care that the comfortable group obtained. The discrepancy would have been even greater except for the large volume of free care received by the poor group.

Free service included service free to the family because paid for by state or local government as well as service given free by the physician. It is becoming widely recognized that physicians and hospitals cannot be expected to render service to the indigent without remuneration and that there must be public responsibility for the medical care of these unfortunates who otherwise must depend upon the charity of physicians. The health survey will provide information as to the amount of disabling illness among these people and the volume of medical services now being received and will give for the first time an accurate picture of the need both of relief clients and the large group of the "medically indigent" who are able to subsist but unable to finance a serious illness.

Today we have preliminary data from this survey, covering as it does three-quarters of a million American families, three and a half million individuals. From it we learn that disabling illness among persons on relief is 68 per cent higher than among those in families with an annual income of $3,000 or over; that the unemployed have twice the disabling illness that the employed have; that Works Progress Administration workers have a disabling illness rate 40 per cent above that of other employed persons; that 1 in every 20 heads of families on relief is unemployed because of disability, while only 1 in 250 heads of families in the higher income groups is unemployed because of disability.

Overwhelming evidence from the National Health Inventory sustains and amplifies data previously compiled by innumerable smaller studies, establishing the conclusion that the excess of sickness and death among the poor requires preventive services and medical care proportionately greater in extent than that demanded by those in the higher income groups whose need is less. Yet even as this conclusion as to what must be done is reached, we face another set of facts, those showing that the groups of the population whose medical needs are the greatest, and which can only be met wholly or in part from public funds, are receiving far less care than the higher income classes whose individual resources place no restriction on the purchase of adequate service. Health Inventory data show that only 67 per cent of the cases

of disabling illness among relief persons received medical attendance exclusive of hospital care, compared with a figure of 80 per cent for those with a family income of $3,000 and over. The average medical services per case of disabling illness were about 50 per cent higher in the highest income group than among persons on relief. Bedside nursing care in the home was given to less than 1 per cent of the disabling illnesses among persons on relief; the proportion so attended in the group with family income of $3,000 and over was 10 per cent.

When facts of denial and destruction of human values such as these I have mentioned, are discussed in terms of the size of the population involved—the tens of millions of men, women, and children who are their victims—the problem of providing adequate health and medical services obviously demands concerted public action for its satisfactory solution. Between 40 and 50 millions of our population are found in families with an annual income of less than $1,000. Upward of 15 millions of the group with family income under $1,000 are found in rural areas which have special need for basic public health services, additional medical and nursing personnel, and hospital facilities. An additional group of some 50 millions of persons with family income between $1,000 and $2,000 requires public aid in the medical care of certain illnesses in which treatment is extremely costly because of their long duration or their demand for specific facilities for diagnosis or care.

As has been pointed out in a recent publication of the Social Security Board, *Social Security in America*, even if a minimum annual income of $2,000 could be maintained through various ways for American families, this amount would still be insufficient to enable them individually to budget against the costs of sickness.

Three possibilities are open to low-income families which suffer extensive illnesses: (1) they may go without needed medical care; (2) they may carry the burden of medical debts; or (3) they may rely upon the charity of doctors and hospitals, or receive their services from tax-supported and philanthropic agencies.

The annual money loss caused by sickness in families with incomes of less than $2,500 a year in the United States in 1929 was estimated as nearly $2,500,000,000. Of this huge sum about $1,500,000,000 represents the expenses of these families for medical care and about $900,000,000 constitutes their loss in wages resulting from sickness. The cost of care in sickness thus exceeds wage loss due to temporary disability. These figures are direct costs. They ignore the much larger costs of sickness represented by the losses in capital values of human life and the losses to commerce and industry. In normal times about one-third to one-half of all the families who have to seek public or private charity are compelled to do so because of the economic effects of accident and illness.

That there will be concerted public action no one measuring the human needs and denials can doubt. In this great democracy with its unsurpassed resources and potentialities for human progress, one-third of our people are not going to remain indefinitely ill-fed, ill-housed, ill-clothed, and ill-cared-for in sickness. Already they are on the march, and the only question which remains is whether those special groups experienced and trained in ways and means of meeting human needs, such as the public health group, are courageously and quickly going to step forward and join the march, to offer all they can give in constructive and progressive leadership and help in the meeting of the vast human problems of today.

The challenge which confronts public health workers today is in essence the same as that which confronted the great leaders of the past when human life was wiped out by epidemics and infectious diseases. The objective for which they strove is identically the same as yours today—to save life, conserve health, to prevent death and disease. So, as I stated earlier, you take on no new function when you turn to new ways and means to meet this unchanging objective. You only face the fact that your battle in the laboratory to find and conquer the causes of destructive diseases, and in the field to apply this knowledge, must not only be continued but widened and extended to the social and economic front. Death and disease are no less your responsibility to prevent because the cause for them has shifted, demanding care of the individual by public means when that individual's economic status makes impossible his securing for himself medical care and facilities necessary for saving life or health.

When the epoch-making Social Security Act became a law of our land, we were engrossed with the specific provisions it contained for safeguarding great numbers of our people from certain hazards and dependencies. These provisions are now being translated into living realities for several million men, women, and children. The distribution of preventive and medical services supported by public funds is being extended. The Act makes specific appropriations of about 14½ million dollars from federal funds in the present fiscal year for the extension of public health services, maternal and infant health, and care of crippled children, acceptance of which in most instances requires matching appropriations by the local and state health departments which directly administer these services. To a limited extent, the Act is making possible the recognition of public health responsibility for the care of the "high cost" illness, typified by cancer, a precedent which has already been established in the field of tuberculosis control. An additional step has been taken in this direction by the recent authorization of federal funds for a cancer research institute under the administration of the Public Health Service. But, in general, public health under the Social Security Act is, so far, expanding along previously accepted lines in which much fundamental work, of course, remains to be done.

Many states are creating departments of public welfare which coördinate all welfare activities including medical care. By admission of part of the social obligation to meet for the dependent groups covered by the Act—the aged, the blind and dependent children, the need for food, clothing, and shelter—the Act has stimulated states to make provision for their health needs also. Some recent state laws specifically mention those groups receiving public assistance funds as being eligible for medical care.

More important even than the special provisions of the Social Security Act and the aid they are bringing to special groups, is the underlying philosophy of that great Act. Through it we have taken our stand as a nation, that human welfare, human conservation is definitely a charge on government—national, state and local—we have entered an era of vital economics. We are pledged, as a people, to writing off our human deficit. Surely no more important step can be taken in this new era and toward this national objective than a concerted, intelligent, and courageous attack by the great public health forces on the needless illness and death of millions of our people through causes demanding fresh methods of approach and solution.

Organized medicine has admitted the problem and indicated it is receptive

to ideas, and is willing to coöperate.

The situation calls for leadership. No one formula or program will probably be found adequate to meet our varied needs, but a composite of many efforts and plans, some in experimental stages, some not yet under way, can and must be found. What group is better fitted to lead and carry through than the public health profession with its medical personnel and its tradition of fair dealing with the public and the medical profession alike?

A far step forward would be taken I think if the American Public Health Association formally recognized the problem of the present unequal distribution of medical services, and the widespread human needs of today, and charged a special committee to cooperate with the U. S. Public Health Service in extending through proper methods the long accepted functions of public health work to meet modern demands and needs of our people. I hope this action may be taken.

Vitaminizing of Margarine

THOSE concerned with the nutrition of groups on low income will be interested in a translation of a report on the vitaminizing of margarine from Denmark. Dr. I. S. Falk of the Social Security Board staff has made available a translation to the *Journal*.

The Danish Ministry of the Interior appointed a commission for considering the addition of vitamins to margarine. The names of the commission include several distinguished physiologists. The commission concluded that there was no doubt that the vitaminizing of all margarine with A and D vitamins will be of great importance in Denmark as many of the people will only in this manner be able to satisfy their natural vitamin requirements without exceeding their means. It was recommended that all margarine should contain 14 to 18 international A vitamin units and 0.1 to 1.0 international D vitamin units per gram. The commission recommended that the A vitamin effect of margarine should be secured by its containing the A vitamin itself and carotin, and in the same proportions as butter, *i.e.*, half of the effect being from A vitamins and about half from carotin. These recommendations were incorporated in an Act of Parliament and have already become effective. Anyone interested in the complete translation may obtain a copy at the American Public Health Association office.

Advances in Public Health Nursing*

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PUBLIC health nursing has advanced in many directions in recent years and today is on the threshold of inspiring developments. There are many more public health nursing services than there were before the depression—the government having greatly expanded its work in this field; the program of public health nursing is considerably widened; and the structure of public health nursing is being rebuilt, solid and scientific matter and manner being substituted for the somewhat meager content and trial and error methods of its infancy.

I intend to speak briefly of the first of these advances and somewhat more at length on the changes in program and structure. To do justice to any of them is impossible in 20 minutes.

The Social Security Act has made possible the creation of many public health nursing services in rural areas, generally as a part of county health units, and has also enabled existing county and municipal services to enlarge their personnel and programs. The principle of governmental responsibility for providing nursing care for the indigent sick has been established and a beginning has been made in putting this principle into practice.

The activity of the government and its assumption in many places of part of the work formerly carried by voluntary agencies has somewhat changed the purposes of the latter. Those voluntary agencies whose responsibilities have been lightened in volume now have before them the opportunity to define and develop the concept of family health work and to explore the possibilities and results of more thoroughgoing work with individuals. In so doing they will be following their historic rôle of path-finding. If their understanding and resourcefulness are equal to their opportunity they can make a contribution of profound value to the cause of public health—a contribution which may add greatly to the professional worth of public health nursing.

Turning to the next line of development, the expansion of the program of public health nursing, we face several new demands. The development of orthopedic nursing under the Children's Bureau finds public health nurses poorly prepared for this specialty but not indifferent to it. Steps are being taken which should enable us to go ahead in this field with greater competency in the future. A specially trained personnel is necessary and is in the first stages of preparation. Also under the stimulus of the Children's Bureau and through the efforts of the Maternity Center Association maternity nursing is going forward. Prenatal supervision is being strengthened through the wider development of mothers' classes and

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fathers' councils, activities which call for substantial, well organized content, and a sound understanding of teaching principles. With recognition of the fact that further reduction in infant mortality depends largely on reducing the number of deaths in the first month of life, increased attention is being given to the problem of prematurity—an area in which skilled nursing is of first rate importance and in which the possibilities of prevention need further study.

State and municipal programs for the reduction of pneumonia, brilliantly led by the examples of the New York and Massachusetts State Departments of Health, envisage the provision of more ample bedside nursing service both in numbers of patients nursed and in amount of service to the individual. It remains for us to convert this ideal into fact.

The increase in cardiac mortality and the subsequent examination of methods of combating it reveal two needs for systematic public health nursing service. There is a definite and pronounced need for intensive work with rheumatic fever patients, including nursing care, adjusting the environment so that a protective regime may be carried out, bolstering morale to the sticking point and protecting the other members of the family from infection if this proves to be a familial disease. In short, a rheumatic fever nursing program perhaps closely resembling the present tuberculosis nursing program is a necessity.

There seems also to be some hope of being of assistance in postponing adult cardiac deaths—many of which now occur in early middle age—through supplementing medical care with efforts to help the cardiac patient make the adjustments, emotional, occupational and otherwise, necessary for him to put into effect the physician's command for limited activity and rest—a rest dependent on mental as well as physical repose.

The increasing prevalence of diabetes has also aroused public health workers to an examination of what needs to be done—an examination which likewise reveals a need for more adequate nursing service. The present sporadic and limited nursing service to a few diabetics needs to be sharpened and developed into a systematic and rounded program for the many. Instruction in diet, in taking insulin, in special hygiene and in precautionary measures must be provided in much more complete and practical detail. Supervision in the maintenance of regime and help with the emotional and social dislocations are often necessary.

The launching of an active campaign against syphilis under Dr. Parran's courageous and vigorous leadership calls for a careful analysis of the part public health nurses should take. It is clear that we have an immediate opportunity, indeed responsibility, for concentrated work where syphilis is found in pregnancy and in infancy. Nursing service in a broad sense for interstitial keratitis will help in reducing blindness. Constructive follow-up service for clinic patients has value when we are soundly informed about the etiology of syphilis, have rid ourselves of moral judgments, and have sufficient grasp of the emotional complications to deal wisely with those we would help. We should also be able to help in the epidemiological approach to the control of the disease.

There can be no question of the imperative need for a great extension of nutrition teaching. Dr. Parran has said that "more children and adults alike suffer from faulty nutrition than from any other form of physical impairment except dental defects, which is

one result of improper diet," and charges that "we have made the most casual attempts to improve the diet of the millions fed at public expense and no more than a gesture at improving the food habits of the rest of the population." Dr. Julian Huxley, eminent English biologist, in considering "the relative degrees of influence, exercised upon successive generations by genetic and environmental or social conditions" says, "it is no longer legitimate to attribute the observed differences in physique and intelligence between social classes mainly to genetic factors. Genetic differences may, of course, exist; but the strong probability is that most of the differences are dependent on differences in nutrition."

That a nation can step upward in the scale of human efficiency as the result of knowing how to feed the body and of being able to buy the necessary foods seems a fair conclusion. The stature, strength and symmetry of today's children who have been reared from birth on nutrition by design instead of by chance are striking evidences of the possibilities. As awareness of the crucial rôle played by nutrition grows, the need for planning a definite community program will emerge, and also the need for implementing the health and family agencies with sufficient staff under the expert guidance of nutritionists to go into the problem of nutrition in detail with the families with whom they are working.

Perhaps the most revolutionary and potentially most valuable of all developments in public health nursing is the recognition that the patient's emotional state is one of the most important factors in his health, that the nurse in every contact she makes has an opportunity to influence emotional factors for better or for worse, and that the futility of her efforts—on those occasions when they are futile—can often be explained by her failure to realize and to take into account the possibility that there may be a deep-seated emotional cause behind the resistance of her patient. Assuming man to be a rational animal, she has not understood the limitations of the individual's conscious responsibility for his own motives and conduct.

This recognition, still in a very elementary stage, has already resulted in a new conception of the nature and possibilities of our work. In child health work a genuine revolution is setting in. The routine teaching of certain standard procedures is giving way to consultation with the parent regarding the particular nature and needs of her individual child, and effort to help her solve her individual problems. The unique opportunity which the nurse has, through the maternity and child health services, to guide the child's parents from the day of its birth, and even before, to an understanding of ways of caring for it which will contribute to its nervous stability and emotional health, is becoming daily more apparent. It is perhaps not over-sanguine to hope that the children of tomorrow may be spared some of the personality difficulties, some of the delinquencies, some of the mental breaks besetting the adults of today, because of having escaped faulty treatment leading to psychological trauma at the outset. Public health nurses are studying child psychology to gain understanding themselves of the interrelation of physical and emotional factors and of the growth of personality as a sound foundation for this extension of child health work into the realm of child guidance.

There is a new conception likewise of prenatal supervision, which is enlarged to embrace better understanding of the mother's emotional reaction toward her pregnancy, and toward the coming child, an attempt to help her release psychic stress, to prepare her in ad-

vance for the emotional as well as the physical care of the baby, and to help her prepare the older children for its coming.

There is a new conception of school health work. It is recognized now that health is not something we can bestow on the school child willy-nilly—except in so far as we can safeguard him from external dangers. The essential of health lies in the value the child himself attaches to it and in his habits voluntarily acquired and maintained. His own interest and volition must be aroused and guided. More knowledge of psychology is giving us better understanding, too, of the ways in which learning that is genuine enough to affect action takes place.

There is an enlarged conception of nursing care of the sick based on the principle that "every disease has a psychic component" as important to recovery as the somatic component; furthermore that no two individuals react alike even to identical circumstances and that the explanation of the patient's occasional failure to coöperate in treatment or to improve as expected may lie in some emotional factor often unrecognized by the patient but which doctor and nurse must take into account if resistance is to be overcome, or recovery achieved.

As for health education, so called, we are beginning to have some insight into how to make the message of scientific medicine mean something vital to the individual. We have been called health messengers and in that guise have naïvely thought that we could carry nuggets of science from the laboratory and deposit them on the doorsteps of the people and that good results would follow. We were blind to the truth of Dewey's statement that no more is something taught when nothing is learned than is something sold when nothing is bought. We thought that the factors of interest and of voluntary activity, without which teaching is worthless, could be aroused through reason. We tried to make up by vehemence and persistence what we lacked in insight, and when we failed we wrote our patient down as uncooperative. More recently we have realized that getting people to adopt new ways is a science based on an understanding of the psychic drives which govern behavior. Even so simple a thing as getting a prejudiced mother to believe that pasteurized milk is safest for her baby may call for something much more subtle than a rehearsal of scientific evidence.

This is not to say that nurses have not been successful in the past in overcoming resistance. The wonder is rather that we have been so often successful. But candor compels us to admit that we have also been baffled time and again and have laid our failure to the contrariness of human nature. Now we are beginning to see that had we understood human nature better we might have discovered the cause of the seeming contrariness and have made our assistance acceptable to the patient.

In short, public health nursing has advanced to the stage of knowing that it is not enough to be a messenger conveying a standard package which we have selected in advance as good for any recipient. We must have our goods in a variety of forms and wrappings and our methods of delivery must be as various as are the people with whom we are trying to establish fruitful relations. The prospective recipient's own plans and desires and interests must be our guide.

While we have been thus engaged in studying the technic of influencing human nature to better ways, we have also been overhauling the content of our teaching, service by service. We are becoming keenly aware of the bearing on public health nursing of scien-

tific data provided by the incessant research going on in biology, chemistry, medicine, and other sciences and are trying to work them into the framework of public health nursing to fill the gaps or to replace empiricism; much that was weak is taking on strength, and there will be increasing substance as our efforts are continued and intensified.

One should include among the advances the trend toward examination of the validity of traditional methods, the serious progress boards of directors of voluntary agencies are making toward equipping themselves for intelligent governance, and progress in many other directions.

Before closing, I must make it clear that I do not mean to imply that public health nursing has preëmpted all of the functions I have mentioned. Some are primarily in the field of family work or of nutrition, and some are common to all aspects of social work, using the term in its generic sense to include public health nursing. The nurse will often need the help of nutritionists and of medical, psychiatric, and family social workers, not to mention the settlement house worker and others. Very frequently she is one of a team which is working on a complicated situation. All of which means that she must be aware of the many factors entering into a given situation, though some of them may be outside of her special competence; must have insight into their relative importance and interplay; must be able to adapt her handling of the situation to these factors; and, finally, she must have the understanding to take her part in a common plan where other workers are involved.

Three conclusions of pressing importance to health officers and public health nursing administrators are inescapable if my understanding of recent and coming advances in public health nursing is even partially accurate. One is that the earlier goal of 1 public health nurse to every 2,000 persons no longer suffices if we are to live up to the possibilities of usefulness that are right on our threshold. Another is that every staff of nurses needs the expert guidance of nutritionists and psychiatric social workers either as members of the staff or available on part time. And the third is that we need superior nurses—superior in range and depth and accuracy of knowledge, superior in understanding the true implications of that knowledge, and superior in skill in putting it to use through our only medium—human relationships.

Diet and Resistance to Infection*

II. The Effect of the Maternal Diet

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THE purpose of this paper is to present studies on the effect of diet upon host resistance to infection under controlled experimental conditions. The question under consideration is: Can the natural resistance of the host to a specific disease agent be significantly altered by simple changes in diet? The diets compared in these experiments fall into two groups, (a) those in effect 2 weeks prior to and during the period of infection (called *experimental* diets), and (b) those in effect during the maternal period (pregnancy and lactation), but not during the period of infection of the progeny (called *maternal diets*). The spread of the disease agent from one host to another was excluded by isolation of the experimental animals. Since we are concerned with *natural* resistance to infection, the immunologic response of the host to the presence of the parasite is not included.

REVIEW

The effect of two different diets upon the resistance of mice to *B. aertrycke* infection was studied by Webster and Pritchett.[1] The Rockefeller Institute diet consisted of baker's bread soaked in fresh pasteurized grade B milk, supplemented by a grain mixture and dog biscuit. The McCollum diet consisted of whole wheat flour, casein, milk powder, sodium chloride, calcium carbonate and butter fat. When pregnant female mice were placed on these diets and their progenies, on reaching 8 to 10 weeks of age, were inoculated by stomach tube, those on the McCollum diet showed consistently higher survival rates. Later work indicated that the butter fat was responsible for the increase in survival.[2]

Topley, Greenwood, and Wilson[3] used the same test organism in a series of dietary comparisons by a somewhat different technic. The mice were placed on the experimental diets only 14 days before exposure. They were not inoculated, but were exposed to risk of infection by adding to each cage containing 100 normal mice, 25 inoculated by the intraperitoneal route. A diet of whole wheat flour, casein, butter, and salt mixture was no more satisfactory than a diet of whole oats, milk, and water. The addition of an excess of butter, or of lard, or of vitamin A concentrate, appeared to act unfavorably, as did the addition of carrots.

The difference in the results of Webster and Topley may be explained by the difference in technic, as mentioned

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by the latter. It is possible, also, that the dietary modifications employed by Topley were not such as to bring into relief the dietary factors operating in host resistance to this infection.

ported elsewhere.[4, 5] These dietary modifications were initiated 2 weeks prior to inoculation and were continued through the period of infection.

In the present series a comparison is

TABLE I

Experimental Diets
Type 350–390

Dry Mixture	*100 Calorie Portion*
Casein,* (dry)	7.2 gm.
Sucrose	17.0
Cellulose, regenerated	0.20
Yeast Concentrate [1]	0.40
Salt Mixture	*
Glycerol	0.15
Fat Mixture	
Linseed Oil (Linol)	0.30
Wheat Germ Oil	0.20
Cod Liver Oil Concentrate [2]	0.0002

* Casein and yeast concentrate were analyzed and the salts were added to make up the total mineral content given below.

Elementary Composition per 100 Calories

	Calories			*Milligrams*							
Diet	*Pro.*	*Carb.*	*Fat*	*Ca*	*Mg*	*K*	*Na*	*P*	*Cl*	*S* †	*Fe* †
371	25	70	5	160	24	195	115	155	177	6.4	2.8
372	25	70	5	40	6	49	29	72	44	1.6	0.7

1. Supplied by Harris Laboratories, Tuckahoe, N. Y.
2. Supplied by Vitex Laboratories, Inc., Harrison, N. J.

† S and Fe figures represent milligrams in salt mixture only.

DIETS

The composition of the diets used in our study is shown in Table I. Each ingredient containing more than a trace of the mineral elements was analyzed, and the total mineral content was calculated. Sufficient salts were added to make the total mineral content of the diet conform to a standard. Vitamins A, D, E, B_1, and G were supplied in definite excess of murine requirements.

These diets were found satisfactory for maintenance and health in uninoculated mice over a period of more than 9 months, but they were not satisfactory for reproduction.

The effect of variations in the mineral content of the diet has been remade between two diets in effect during the maternal period (pregnancy and lactation) and continued in the progeny until they reached the age of 6 weeks. Both groups were then put on the same diet, and 2 weeks later were inoculated. The two diets compared during the maternal period were "200," a modified Steenbock diet,[6] and "221," a Sherman diet [7] (Table II).

The comparisons are limited to the D-line (Swiss) mice, which for many previous generations had been maintained upon a diet of bread and milk, supplemented twice a week with a mixture of oats and buckwheat, and once a week with dog biscuit.[1] On their arrival in our laboratory, all were changed to diet 200 for 2 months. Some

TABLE II

Composition of Diets

Diet 200	*Parts*	*Diet 212*	*Parts*
Whole Ground Corn	64.0	Extracted Casein	20.0
Linseed Oil Meal	16.0	Sucrose	76.0
Crude Casein	5.0	Brewer's Yeast	10.0
Wheat Germ Meal	10.0	Salt Mixture	4.0
Powdered Whole Milk	5.0	Lard	2.0
Brewer's Yeast	2.0	Cod Liver Oil	2.0
Ground Alfalfa	2.0	Wheat Germ Oil	0.3
Sodium Chloride	0.5	*Diet 221*	
Calcium Carbonate	0.5	Ground Whole Wheat	66.0
Cod Liver Oil	1.73	Powdered Whole Milk	33.0
		Sodium Chloride	1.0

Elementary Composition per 100 Calories

	Calories			*Milligrams*					
Diet	*Pro.*	*Carb.*	*Fat*	*Ca*	*Mg*	*K*	*Na*	*P*	*Cl*
200	16	68	16	118	19	152	62	90	98
212	19	72	9	149	18	270	43	145	52
221	16	59	25	105	13	199	136	139	232

of the breeding lots were then placed on diet 221 (which is similar in composition to their ancestral diet of bread and milk), while others were continued on diet 200. These diets are compared in Table III with respect to their effect on fertility, litter size, growth, and infant survival.

EXPERIMENTAL

The effect of diet upon host resistance has been tested in more than 2,000 mice, of 3 inbred lines obtained from Dr. L. T. Webster of the Rockefeller Institute. Two of these lines have reached the 7th generation in our breeding colony. The A-line are Rockefeller Institute Resistant Mice, produced by selective breeding and propagated for many generations by close inbreeding. The D-line are an unselected line of inbred Swiss mice.

The progenies of each generation have been tested at 8–9 weeks of age by inoculation with *Salmonella enteritidis*. A standard dose of 0.005 c.c. of

TABLE III

Breeding Data

Maternal Diets 200 and 221

	Diet 200	*Diet 221*
Number litters born	206	106
Average litter size	6.0	6.4
Fertility of mothers	73 per cent	79 per cent
Survival of young to:		
10 days	76 "	74 "
25 days	69 "	67 "
Average weight at:		
10 days	4.7 grams	4.8 grams
25 days	10.2 "	10.2 "
Inoculation	19.8 "	20.4 "

TABLE IV

High Mineral and Host Resistance
Survival of Progenies Inoculated with S. enteritidis

A-Mice

Group	Diet	Mice Inoc.	Surv. Each Week 1	2	3	4	Survival Per cent
M106	351	20	20	18	17	17	85
M118	361	20	20	19	18	18	90
M127	371	20	19	19	19	19	95
M128	373	20	19	19	19	19	95
M145	371	20	20	18	18	18	90
	Total	100	98	93	91	91	91.0

Standard deviation = 2.9

an 18 hour broth culture in a volume of 0.4 c.c. was administered by stomach tube to each animal. This dose contains 3 to 5 million organisms, as determined by the dilution method. The stock culture used has been kept on agar slants in the icebox, and has shown no significant change in virulence when tested at intervals with mice on a standard diet.

The mice were placed upon the experimental diet 2 weeks before inoculation. They were maintained in individual cages in an air-conditioned room, and observed daily for 4 weeks after inoculation. Groups of approximately 20 mice of the same genetic and dietary background were compared on each diet. These mice had no previous contact with the test organism, and possessed no specific immunity so far as could be determined. The survival percentage in each group at the end of 4 weeks can therefore be taken as an index of host resistance.

RESULTS

The results of a series of host resistance tests on the A-line of mice are shown in Table IV. The survival percentages in the individual tests indicate the normal variation. The standard deviation of the large group is calculated from the formula, $\sigma = \sqrt{\frac{p\,q}{n}}$ (method of Topley and Wilson [8]). The individual results fall within the limits $\pm 2\,\sigma$ of the mean and therefore on the normal distribution curve. The diet used in all these tests was the high mineral diet, with minor modifications in the kind and quality of the fat, which had no apparent influence upon survival.

TABLE V

High Mineral vs. Low Mineral
Survival of Progenies Inoculated with S. enteritidis

A-Mice

Experimental Diet	No. of Mice	Survival No.	Survival Per cent
High Mineral	100	91	91.0
Low Mineral	100	66	66.0

Diff. = 25.0 SED = 5.72 Quot. = 4.37 Odds 84,000:1

TABLE VI

Maternal Diet and Host Resistance
Survival of Progenies Inoculated with S. enteritidis

D-Mice

No.	Maternal Diet	Experimental Diet	No. of Mice	Survival	
				No.	Per cent
(1)	200	221	32	16	50.0
(2)	221	221	33	4	12.1

Diff. = 37.9 SED = 11.48 Quot. = 3.30 Odds 1,100:1

The comparison of the high mineral with the low mineral diet is shown, for the A-mice, in Table V, taken from another report.[5] The diet of the second group differed from that of the first in but one respect: the minerals were reduced to one-fourth the normal level. The mean survival in this group of 100 mice on low mineral intake was 66.0 per cent, as compared with 91.0 per cent on the high mineral diet. The difference is 25.0 per cent; the standard error of this difference is 5.72; the quotient is 4.37; and the odds against this difference being a chance result are 84,000 to 1. This type of statistical analysis [8] provides a means of measuring the significance of the results, and will be used in subsequent comparisons.

In the first experiment of the maternal diet series, the progenies from diets 200 and 221 were put on diet 221 during the experimental period. Table VI shows the survival in each group. Of those born on diet 200, 50.0 per cent survived the infection, whereas of those born on diet 221 only 12.1 per cent survived. The difference is 37.9 and the odds are 1,100 to 1. This suggests that the maternal diet is an important factor in host resistance. The test would be more critical, however, if the diet during the experimental period differed from the two maternal diets. This was done by instituting the purified experimental diets and changing the progenies from both maternal diets to the same experimental diet 2 weeks before inoculation. The results in Tables VII and VIII show a consistent difference between the two maternal diets. Using experimental diet 212, the survival in those born on diet 200 was 50.0 per cent, as compared with 8.7 per cent in those born on diet 221 (Table VII). The difference is 41.3 and the odds are 370 to 1 in favor of the significance of this difference. Using an experimental diet even more highly purified than the one above, the difference in host resistance of progenies from the two maternal diets is

TABLE VII

Maternal Diet and Host Resistance
Survival of Progenies Inoculated with S. enteritidis

D-Mice

No.	Maternal Diet	Experimental Diet	No. of Mice	Survival	
				No.	Per cent
(3)	200	212	20	10	50.0
(4)	221	212	23	2	8.7

Diff. = 41.3 SED = 13.78 Quot. = 3.00 Odds 370:1

TABLE VIII

Maternal Diet and Host Resistance
Survival of Progenies Inoculated with S. enteritidis

D-Mice

	Maternal	*Experimental*	*No. of*	*Survival*	
No.	*Diet*	*Diet*	*Mice*	*No.*	*Per cent*
(5)	200	371	53	23	43.5
(6)	221	371	54	4	7.4

Diff. = 36.1 SED = 8.57 Quot. = 4.21 Odds 39,000:1

no less striking (Table VIII). The group born on diet 200 gave a survival percentage of 43.5, as compared with 7.4 in those born on diet 221. The difference is 36.1 and the odds are 39,000 to 1 in favor of its significance.

We sought next to determine whether the effect of these two diets on resistance to enteritidis infection is restricted to the period of pregnancy and lactation. The young are weaned routinely at 25 days, and are continued on the diet of the mother until they reach 6 weeks, when they are changed to the purified diet. It is possible that the diet of the young in the 2 weeks following weaning determines their host resistance. This was tested by changing a group of mice at the time of weaning from diet 200 to diet 221 (Table IX). Another similar group was continued on diet 200, while a third group, born on diet 221, was continued on the same. At 6 weeks of age all three groups were changed to the purified diet 371, and 2 weeks later all were inoculated. The slight difference in survival between the first two groups is not significant, showing that diet 221, when fed only after weaning, has little if any effect on host resistance. Those born on diet 200, however, and changed at weaning to diet 221, showed 55 per cent survival, as compared with 0 survival in those born on diet 221. The difference is 55.0 and the odds against this being a chance result are 3,200 to 1.

DISCUSSION

These differences in the host resistance of young mice from the two maternal diets appear to be the result of differences in the nutrition of the mother. Upon identical diets and environmental conditions during the experimental period, beginning 2 weeks prior to inoculation, the progenies from diets 200 and 221 respectively show a significant difference in survival per-

TABLE IX

Maternal Diet and Host Resistance
Survival of Progenies Inoculated with S. enteritidis

D-Mice

	Maternal	*Intermediate*	*Experimental*	*No. of*	*Survival*	
No.	*Diet*	*Diet*	*Diet*	*Mice*	*No.*	*Per cent*
(7)	200	200	371	20	13	65.0
(8)	200	221	371	20	11	55.0
(9)	221	221	371	20	0	0.0

Diff. (7–8) = 10.0 SED = 15.50 Quot. = 0.65 Odds 0.9:1
Diff. (8–9) = 55.0 SED = 15.25 Quot. = 3.61 Odds 3,200:1

centage. It has been shown that this difference is induced during the period of nutritional dependence upon the mother (Table IX).

Variation in animal species occur as the result of (a) mutation (change in genetic constitution), and (b) modification (change in environment). The D-mice used in these experiments were pen-inbred for many generations at the Rockefeller Institute and have been brother-sister inbred while in our laboratory. Sibling mating has not been continued long enough in this line to rule out absolutely the possibility of heterozygous progenies. However, the consistency of the survival data on the two diets makes the possibility of original differences in genetic constitution a remote one.

The diet of the mother during pregnancy and lactation is an important environmental factor in the development of the young and in these experiments appears to bring about modification of the host resistance characteristics of the progeny. It has been shown (Table V) that a homozygous line of mice (Line A), highly resistant to *S. enteritidis,* becomes susceptible when the mineral content of the experimental diet is reduced to one-fourth the normal. The diet during the experimental period may thus have an effect upon host resistance, but in the D-line mice this effect was minor compared with the influence of the diet of the mother. The data on the effect of maternal diet on the A-mice are not yet complete.

The technic used by Topley [3] subjected the mice to the experimental diet for only 14 days prior to inoculation, while that first employed by Webster [1] placed the young under the influence of the diet beginning early in intrauterine life. The difference in their results appears to be largely due to this difference in technic.

The two diets employed in our series differ widely in elementary composition (Table II) as well as in vitamin content, so that the specific dietary element or elements responsible for this modification in resistance characteristics are not yet identified. In our experience these two maternal diets are nearly equal with regard to fertility, litter size, and growth of the progeny (Table III), and we have no indication of any known dietary deficiency in mice maintained on them for 7 generations. The progenies from the two maternal diets were changed 2 weeks prior to inoculation to the same purified diet (with minerals and vitamins in excess of known requirements) and continued through the period of infection on this diet. Under comparable experimental conditions the host resistance of those from diet 200 was consistently and significantly greater than of those from diet 221.

These results with mice suggest that the maternal diet is a factor of major importance in determining the host resistance of the progeny. The diet of the mother may thus play an important rôle in evolution by influencing the survival of the offspring on exposure to the risks of infection.

SUMMARY

Two diets equally satisfactory for growth, reproduction, and rearing of young mice were found to differ in their effect upon the host resistance of the progeny to *Salmonella enteritidis* infection. The modification in host resistance characteristics was induced during the period of nutritional dependence upon the mother and persisted in spite of later changes in diet. ***The diet of the mother appears to be a factor of major importance in influencing the survival of the offspring to the risks of infection.***

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Beauty Aids

FOLLOWING is an excerpt from the memorial lecture delivered by Dr. Haven Emerson, celebrating the 100th birthday of Dr. Charles Frederick Chandler, a founder of the American Public Health Association:

Almost daily some new and secret-formula product is offered for human use and consumption, untested biologically before commercial exploitation and used widely by the ever gullible public, avid for novelty, convenience, or apparent profit, until some unsuspected but irremediable damage to the consumer has developed to warn physicians and sanitarians of a new problem in diagnosis, treatment, and prevention.

As one looks about at the cadaveric fingertips, the enameled toe-nails, the deformed eyebrows, the filled facial creases that try to reveal character but are cheated out of it, the hectic cheek reminiscent of the fever ward of a tuberculosis hospital, the ill-assorted daubs of aniline upon the lips, one wonders if it is worth the while of Congress to try to enact protective legislation, or health officers and their laboratories to attempt enforcement of local ordinances to save a beauty-mad generation from those qualities of cosmetics that threaten to replace the bloom of health with one more appropriate to a dish of wax fruit.

Advantages of Peptone Iron Agar for the Routine Detection of Hydrogen Sulphide Production*

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DURING an extensive study of the *Escherichia-aerobacter* "intermediate" group,[1] during which the production and detection of hydrogen sulphide was under investigation, it was found that peptone iron agar was much superior to lead acetate agar, the medium which has commonly been regarded as best for this purpose. This had been the experience of Levine, *et al.*,[2,3] with organisms of the "intermediate" group. With positive cultures, the iron agar became intensely black in color and its use permitted the interpretation of the results to be made after a shorter period of incubation than with acetate medium. These advantages of the iron agar were so striking that it seemed important to determine whether it would also be superior to acetate agar with all members of the Gram-negative enteric bacteria, and whether it would prove to be more useful for the routine recognition of these organisms. The present paper gives the results of such an investigation.

METHODS AND MATERIALS

In all, 376 cultures were employed. All of the common species of the Gram-negative enteric group, the aerobic spore-bearing bacilli, the cocci, and the Serratia genus were represented. The cultural characteristics of most of the strains were determined in detail to permit exact taxonomic allocation to be established. Exceptions were made for the sporogenous bacteria, for which the species designations listed are those given by the laboratories from which the organisms were obtained.

The media for detecting hydrogen sulphide production, Peptone Iron Agar (Difco) and Lead Acetate Agar (Difco), were prepared in the usual way. They were dispensed in 7–8 c.c. amounts in ordinary 15 x 1.5 cm. culture tubes and sterilized in the autoclave at 15 lb. pressure for 20 mniutes. Inoculations were made along two opposite walls of the culture tube by the stab method, the needle being inserted to the bottom of the column of agar. The "source" cultures were either on agar slants or in broth. Incubation was at 37° C. and at room temperature for 6 days, unless positive results were produced sooner.

RESULTS

The production of hydrogen sulphide in the iron agar was evidenced by an intense blackening and in the acetate

* This work was supported in part by contributions from the General Education Board Research Fund and the Department of Biology, College of Arts and Science, University of Rochester.

agar by the development of a brownish-black or a brown color, which was often so slight that the interpretation was uncertain.

The rate of hydrogen sulphide production in the iron agar was faster than in the acetate agar, the results in the former medium being available after incubation for from 8 hours to 2 days and those in the latter after 1 to 3 days.

Incubation at 37° C. was more favorable for hydrogen sulphide production than that carried on at room temperature, except in the case of certain strains of *Salmonella pullorum*.

Hydrogen sulphide was produced in the iron agar by every culture which formed it in the acetate agar, with the exception of 3 strains of *Salmonella morgani* and of 5 atypical strains of the Proteus genus, where very slight browning of the acetate medium occurred. Whether or not the interpretation of this reaction as hydrogen sulphide production was correct cannot be settled at this time. In the iron agar, these strains formed a brownish-red color which was not considered as evidence that hydrogen sulphide had been produced. Con-

TABLE I

Production of Hydrogen Sulphide in Peptone Iron Agar and in Lead Acetate Agar

Bacteria	No. of Strains Tested	Pos. Reactions: Peptone Iron Agar	Pos. Reactions: Lead Acetate Agar
Salmonella Schottmülleri	6	6	6
Salmonella aertrycke	3	3	3
Salmonella enteritidis	20	20	20
Salmonella suipestifer	2	2	2
Salmonella Morgani	3	0[1]	3[2]
Salmonella gallinarum	14	13	13
Salmonella pullorum (aerogenic)	14	14	14
Salmonella pullorum (anaerogenic)	22	16	15
Salmonella paratyphi	6	0	0
Eberthella typhi	15	15	15[3]
Shigella dysenteriae (Shiga)	3	0	0
Shigella paradysenteriae (Flexner)	9	0	0
Shigella paradysenteriae (Hiss & Russell)	1	0	0
Shigella paradysenteriae (Sonne)	20	0	0
Shigella dispar	4	0	0
Shigella alkalescens	3	0	0
Shigella ambigua	2	0	0
Escherichia "coli" group	23	0	0
Escherichia "communior" group	20	0	0
Escherichia-Aerobacter "intermediates"	31	20	20
Aerobacter aerogenes	20	0	0
Aerobacter oxytocum	15	0	0
Aerobacter cloacae	14	0	0
Aerobacter levans	2	0	0
Proteus vulgaris	4	4	4
Proteus mirabilis	19	19	19
Proteus X19 (Felix)	2	2	2
Proteus X19	2	2	2
Proteus X2 (Felix)	2	2	2
Proteus XK (Kingsbury)	2	2	2
Proteus, unclassified	5	0	0
Proteus, unclassified	5	0[1]	5[2]
Staphylococcus aureus	10	0	0
Staphylococcus albus	3	0	0
Micrococcus aurantiacus	1	0	0
Neisseria catarrhalis	2	0	0
Micrococcus, unclassified	12	0	0
Serratia, unclassified	9	0	0
Bacillus anthracis	1	0	0
Bacillus pseudotetani	1	0	0
Bacillus subtilis	4	0	0
Bacillus cereus	1	0	0
Bacillus megatherium	1	0	0
Bacillus mycoides	1	0	0
Bacillus, unclassified	7	0	0

[1] Production of a brownish-red color, totally unlike hydrogen sulphide blackening

[2] Production of a light brown color, which may or may not have been due to the production of hydrogen sulphide

[3] Production of a light brown color with many of the cultures rendered the interpretation of results difficult

versely, hydrogen sulphide was formed in the acetate agar by every strain which did so in the iron agar, with the exception of a single strain of *Salmonella pullorum*. A detailed list of the bacteria studied and of the results of the tests in the two media are given in Table I.

DISCUSSION

Peptone iron agar has been found to be more suitable than lead acetate agar for the production and detection of hydrogen sulphide. With positive cultures, it turns an intense black, thereby rendering the interpretation of results easy and reliable. Lead acetate agar, on the other hand, becomes brown or brownish-black, often to such a slight extent only that the results are uncertain. The difference between these colors is more marked with some cultures than it is with others. *Eberthella typhi* usually produces a light brown color in the acetate agar, but it always yields a distinct blackening in the iron medium. On the other hand, the members of the Salmonella genus which produce hydrogen sulphide give rise to definite blackening in both media. Positive results in the iron agar occur after a shorter period of incubation than in the acetate medium, obviously an advantage in routine testing.

The production of hydrogen sulphide may be employed successfully for distinguishing certain closely related species or types of bacteria. Thus, this reaction will separate *Salmonella schottmülleri, Salmonella enteritidis* and *Salmonella aertrycke* from *Salmonella paratyphi;* or *Eberthella typhi* from the dysentery bacilli, or certain strains of the *Escherichia-aerobacter* "intermediate" group from the typical members of the Escherichia and Aerobacter genera. Furthermore, it is also useful in separating members of the Proteus genus.

Although the period of incubation necessary to elicit positive results varies somewhat with the species under test, an incubation period of 4 days is sufficient with any of the cultures listed in Table I.

SUMMARY

It has been found advantageous to use peptone iron agar for the production and detection of hydrogen sulphide in a study of 376 bacterial strains, representing all of the common species of the Gram-negative enteric group, the cocci, and the aerobic sporogenous bacteria. The results have been compared with those obtained with lead acetate agar.

The production of hydrogen sulphide was manifested in the iron agar by an intense blackening and in the acetate medium by the development of a brownish-black or a brown color. The reaction in the iron agar was always much easier to interpretate than in the acetate medium, thus no uncertain findings were encountered.

The production of hydrogen sulphide in the iron agar was detected after shorter incubation than in the acetate medium, an advantage in routine testing.

The production of hydrogen sulphide is a valuable differential test in separating certain closely related bacterial species or types. The test has not found general favor, because of the frequent difficulty encountered in interpreting the reaction in lead acetate medium. The use of peptone iron agar eliminates this difficulty.

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A Practical Study of Procedures for the Detection of the Presence of Coliform Organisms in Water*

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THE study of certain selective media proposed for the detection of the presence of coliform organisms in water, which was initiated by the Committee on Standard Methods in 1934, has been directed, during the years of 1936 and 1937, toward an attempt to determine the comparative practical utility of these media when employed in routine water analysis.

The purpose of the study may be reviewed briefly. The eighth edition of Standard Methods of Water Analysis specifies, for detection of the presence of coliform organisms in water, the use of lactose broth as a primary medium. The 24 hour presumptive,† or the production of gas in the broth within 24 hours, is accepted as a satisfactory indication of the presence of the organism in certain raw waters, sewages, etc., where no great accuracy in the result of the test is required. When moderately accurate results are desired, 5 different methods of conducting a so-called "confirmed test" of the presumptives, 1 employing an agar plate and 4 employing liquid selective media, are permitted; and when extreme accuracy is demanded, the so-called "completed test," which consists in an attempt to isolate coliform organisms, is prescribed.

For many years previous to the publication of the last edition, *Standard Methods of Water Analysis* required the use of Endo or Eosin-methylene-blue agar plates in the tests now designated as the "confirmed" and "completed" tests. The detection of the presence of coliform organisms in the transfer made from the lactose broth presumptive to the agar plate, however, depends largely upon the facility with which these organisms produce characteristic colonies on the plate and upon the ability of the technician to recognize such colonies. Here was to be found a very vulnerable feature common to both of these confirmatory procedures. For although a technician with little experience may usually recognize coliform colonies on plates seeded from presumptives from rather polluted waters, raw or unfinished, even very experienced technicians are frequently puzzled when confronted with the assortment of atypical colonies which appear on many plates in the course of examination of less polluted waters such as wells, springs, lakes, and finished wa-

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† Unless otherwise defined, "presumptive" will be employed to designate the production of gas in a fermentation tube.

ters. At best, the fishing of suspected colonies from the agar plate is frequently a highly speculative procedure. So true is this that, as will be shown later, a loss of 20 to 30 per cent of isolations of coliform organisms is not an infrequent experience of routine laboratories. A most unsatisfactory result of the use of the agar plate methods is the possibility that two workers may secure from the same presumptives, through the use of the same method, quite different results. Chance and the personal factor often play too important rôles in these procedures.

In order to eliminate speculation and the personal factor from confirmatory methods, shorten the time required for the final result and, at the same time, effect a considerable reduction in the cost of water analyses, a very simple confirmatory procedure was introduced in the last edition of the *Methods*, viz., the transfer of a loop of the mixed culture from the lactose broth presumptive to a liquid selective medium, the production of gas in the medium to serve to indicate the presence of the organisms sought. This method possesses several advantages: the favorable feature of the lactose broth primary, its marked productivity, is retained; the personal factor and the speculation involved in the fishing of atypical colonies are eliminated; the result of the procedure is clean-cut, positive or negative; two workers, regardless of their experience in water work, are practically certain to secure identical results from the same presumptives. Furthermore, this method requires so little labor and material that all lactose broth presumptives may, at little cost, be confirmed, instead of the one or few obtained from the smallest amount of sample tested (another speculation enforced, in practice, by the use of the agar plate).

Whereas the time required for the lactose broth completed test procedure varies ordinarily from 3 to 5 days (if spores are encountered, several days more may be necessary), the proposed method requires from 2 to 4 days. Finally, if circumstances require it, the isolation of coliform organisms from the liquid selective presumptive may be attempted with, as will be demonstrated, quite as favorable results as those obtainable from the lactose broth presumptive. There is little doubt that, given a suitable medium, this confirmatory method should prove a boon to many overworked water laboratories which have been striving to conform to the requirements of *Standard Methods* and also permit, at a reduced cost, a much closer control of the supplies under their supervision than formerly was possible.

In the last edition of the *Methods*, 4 liquid selective media were suggested for use in this proposed confirmatory procedure. It was to determine the relative value of these media, with the view eventually to a reduction in their number, and to secure fairly conclusive information regarding the practical general utility of the liquid confirmatory method as compared with that of the usual, or agar plate "completed test," that the present study was undertaken by the committee.

OUTLINE OF THE WORK

Following the indications furnished by the investigations of Ruchhoft [1] and his collaborators on the relative productivity with reference to coliform organisms exhibited by certain media and on their relative inhibition of growth of various lactose-fermenting spore-formers, not only were the 4 selective media of *Standard Methods* (brilliant green bile, 2 per cent, crystal violet broth, fuchsin broth, and formate ricinoleate broth) chosen as confirmatory liquid media, but fuchsin broth was also chosen as a primary medium for comparison with lactose

broth. The composition and methods of sterilization of these media are shown in Table I. The materials required were provided, in dehydrated form, through the courtesy of Difco Laboratories, Detroit, Mich. The approval of each of the dehydrated selective media was secured from its proponent.

The laboratory procedures specified for the comparative work included, briefly, planting of 5 portions of each of at least two dilutions of sample (usually 5 portions of 1 c.c., and 5 portions of 10 c.c.) in lactose broth and also in fuchsin broth. Upon appearance of gas in either of these primary media, confirmation by the "completed test" was specified and, in addition, transfer of a loopful of culture from each lactose broth presumptive to brilliant green bile, crystal violet broth, fuchsin broth and formate ricinoleate broth. The production of gas in any of these confirmatory media was to be followed by the "completed test," in an attempt to determine the reliability of this indication of the presence of coliforms. Since the limited schedule of operations described might entail, in the course of examination of a single sample, 60 "completed tests," the large amount of work required for its application to even a small group of more or less polluted samples is manifest. The directors of 21 state, provincial, and city laboratories in the United States and Canada agreed to collaborate in the study. A list of these collaborators and of their laboratories is given below.

The volume of work accomplished by these laboratories is evidenced by the total of 1,213 water samples yielding presumptives which they examined and by the total of 24,071 "completed tests" which they performed. Hundreds of other samples were examined, but since they yielded no presumptives in either of the primary media, they are not included in the tabulations to follow. The Chicago laboratory, for example, examined 258 such samples of treated water, employing 10 portions of 10 c.c. each, which are omitted from the record. Certain other results, which are incomplete, are likewise omitted.

The summary of the results of this extensive coöperative effort will be presented in two parts: (1) A comparison of the 5 methods of confirmation of the lactose broth presumptives; (2) A comparison of the procedures employing primary fuchsin broth with or without "completed" confirmation, with the usual *Standard Methods* procedure.

I THE FIVE CONFIRMATORY PROCEDURES (AGGREGATE RESULTS)

These 5 procedures for confirmation of lactose broth presumptives include the usual "completed test" and the 4 "confirmed tests" of *Standard Methods* employing brilliant green bile, crystal violet broth, fuchsin broth, and formate ricinoleate broth.

A total of 1,213 water samples yielded 6,043 lactose broth presumptives which were confirmed by the 5

STATE AND PROVINCIAL LABORATORIES

Alabama—Birmingham, J. G. McAlpine and G. A Denison
Decatur, J. G. McAlpine and C. C. Johnson
Arizona, R. A. Greene and W. B. West
California, W. H. Kellogg and M. S. Foreman
Connecticut, F. L. Mickle and D. E. West
Georgia, N. M. DeJarnette
Indiana, B. H. Jeup and M. S. Campbell
Kansas, C. Ritter
Minnesota, H. A. Whittaker and George O. Pierce
New Jersey, J. V. Mulcahy and J. E. Bain
New York, F. W. Gilcreas
Ohio, L. F. Ey
South Dakota, C. H. Hunter
Ontario—Fort William, A. L. MacNabb and J. W. Bell
North Bay, A. L. MacNabb and W. M. Wilson
Toronto, A. L. MacNabb and A. D. McClure
Quebec, M. H. McCrady and J. Archambault

CITY LABORATORIES

Chicago, Ill., J. L. White and R. E. Noble
Indianapolis, Ind., H. E. Jordan and L. C. Boatman
Minneapolis, Minn., F. Raab and George Lundell
St. Louis, Mo., A. V. Graf

TABLE I

Media

Medium	*Comparison Materials in Grams per Liter*	*Amount of Dehydrated Media per Liter and Media per Tube* *	*Sterilization*
Lactose broth (Standard Methods)	Beef extract 3.0; peptone 5.0; lactose 5.0	13.0 gm. per liter. 10 c.c. per tube	15 lb. for 15 min.
Fuchsin lactose broth	Beef extract 3.0; peptone 5.0; lactose 5.0; basic fuchsin 0.015	13.0 gm. 10 c.c. per tube	15 lb. for 20 min.
Brilliant green bile	Oxgall 20.0; peptone 10.0; lactose 10.0; brilliant green 0.0133	40 gm. 10 c.c. per tube	15 lb. for 15 min.
Crystal violet lactose broth (Salle)	Peptone 5.0; dipotassium phosphate 5.0; potassium dihydrogen phosphate 1.0; lactose 5.0; crystal violet 0.00143	16 gm. 10 c.c. per tube	15 lb. for 15 min.
Formate ricinoleate broth (Stark and England)	Peptone 5.0; lactose 5.0; sodium formate 5.0; sodium ricinoleate 1.0	16 gm. 10 c.c. per tube	11 to 13 lb. for 15 min.

* For sample portions of 1 c.c. or less. For larger portions of sample, see *Standard Methods of Water Analysis*, Eighth Edition.

methods. Since the appearance of gas in the selective liquid media was also followed by the "completed test," the total of presumptives subjected to the "completed test" numbered 21,168 from which 15,538 coliform isolations were secured.

The aggregate "completed test" results obtained from the confirmation of the 6,043 primary lactose broth (L B P) presumptives through the use of the 5 different methods, are shown in Table II.

It will be observed, in columns 1 and 2 of Table II, that the greatest number of confirmatory presumptives, as well as the greatest number of coliform isolations, was obtained from the formate ricinoleate broth, and the smallest number in each instance from the brilliant green bile. On the other hand, the proportion of the presumptives which yielded coliform isolations was greatest when brilliant green bile was employed, and least when formate ricinoleate was employed.

The figures of column 3 represent the number of lactose broth tubes, from which coliform organisms were not isolated by the particular procedure in question, but from which they were isolated by one or more of the other methods. These figures show that the usual "completed test" failed to isolate coliforms from 504 lactose broth presumptives which, when transfers were made from them to the selective confirmatory media, were proved to contain the organisms. Thus, by means of the 4 liquid confirmatory procedures, an additional 8.3 per cent of the lactose broth presumptives were shown to contain coliforms. Adding this proportion to the 51.7 per cent of complete confirmations effected through the use of the usual procedure, the total of 60 per cent of presumptives completely confirmed, of column 4, is obtained. In other words, 60 per cent of the lactose broth presumptives were proved, by the use of 5 confirmatory methods, to contain coliform organisms.

TABLE II

Results of 5 Different Methods of Confirmation of 6,043 Lactose Broth Presumptives Obtained from 1,213 Samples

	1	2		3		4	
		Coliforms Isolated		*Coliforms Isolated from Corresponding Lactose Broth Presumptives by Other Procedures*		*Sum of Columns 2 and 3; Tubes Containing or Probably Containing Coliforms*	
Confirmation Procedure	*Presumptives No.*	*No.*	*Per cent of Presumptives*	*No.*	*Per cent of Presumptives*	*No.*	*Per cent of Presumptives*
SMC *	6,043	3,124 (3)	51.7	504	8.3	3,628	60.0
BG (+SMC)	3,488	3,074 (8)	88.1	225	6.5	3,299	94.6
CV (+SMC)	3,742	3,101 (4)	82.9	289	7.7	3,390	90.6
F (+SMC)	3,804	3,072 (6)	80.8	275	7.2	3,347	88.0
FR (+SMC)	4,097 (6)	3,199 (11)	78.1	324	7.9	3,523	86.0

The first figure of column 4 indicates that the number of lactose broth primary tubes from which, by one or more methods, coliform organisms were isolated = 3,628.

NOTE: The figures in parentheses (which are included in the adjoining totals) represent the number of missing tubes, incomplete results, etc., which were considered positive in order to avoid loss of the remaining data obtained from these particular samples; a study of these data suggests that the error thus introduced is very probably negligible.

* The symbol SMC signifies the *Standard Methods* "completed test" procedure; BG, CV, F and FR signify the use of brilliant green bile, crystal violet broth, fuchsin broth and formate ricinoleate broth, respectively, as liquid confirmatory media.

The question immediately arises: if the 4 additional confirmatory procedures show that the usual "completed test" failed to detect the presence of coliform organisms in 8.3 per cent of the presumptives, or about 14 per cent of all presumptives proved to contain these organisms, what may be the *total* error of the "completed test"? Perhaps no entirely satisfactory answer will ever be given to this question. It is of some interest to note, however, that in the case of Quebec's lactose broth presumptives the use of one more confirmatory medium (a buffered non-formate ricinoleate broth) showed an additional "completed test" error of nearly 6 per cent of the error revealed by the other 4 methods.

The figures of column 3 which pertain to the selective broth procedures are not subject to the definite interpretation which can be applied to those which refer to the usual "completed test" procedure. It is very highly probable, however, that the production of gas in one of these selective media, following transfer from a lactose broth presumptive which has been proved to contain coliform organisms, is really due to the presence of the organisms in the selective medium, even though none have been isolated by one trial from the latter. From a practical standpoint, therefore, it is reasonable to attribute to all the figures of column 3 a like significance: presumptives which contained coliform organisms. The high proportion of 94.6 per cent of brilliant green bile presumptives in this category, is of particular interest; and it is to be remembered that even this figure probably *underestimates* the true proportion.

The number of presumptives of each of the selective media from which coliform organisms were not isolated by the routine "completed test," and the number of these, from the corresponding lactose broth primary of which coliform organisms were isolated by one method or another, are shown in Table III.

Whereas 17.3 per cent of the non-confirming lactose broth presumptives were proved to contain coliforms, 36 to 54 per cent (and probably a greater proportion) of the non-confirming pre-

TABLE III

Non-confirming Presumptives

Procedure	Number of Non-confirming Presumptives	Non-confirming Presumptives, from the Corresponding LBP of Which, Coliform Organisms Were Isolated by Means of Other Broths	
		No.	Per cent
LBP	2,919	504	17.3
LBP + BG	414	225	54.3
LBP + CV	641	289	45.1
LBP + F	732	275	37.6
LBP + FR	898	324	36.1

sumptives of the selective media may be considered, from a practical standpoint, to have constituted a satisfactory indication of the presence of the group.

For many years past the results obtained from the usual " completed test " following the lactose broth presumptive have been employed almost exclusively as a standard of performance for comparison with the performance of other procedures. Although it was well known that this standard method was imperfect, to what extent it was imperfect was a subject for speculation. The results of the present study, however, reveal that the error to which " completed test " results are subject is often of considerable magnitude. As a consequence, the abandonment of the usual " completed test " results as a performance standard and the substitution therefor of the " completed test " results secured through the use of *all* the confirmatory methods employed in the present study appear to be justified.

Table IV, accordingly, presents certain data of Table II in the form of percentages of the number of sample portions from which coliform organisms were isolated by any of the 5 confirmatory procedures. The first column of figures of this table shows clearly the comparative practical performances of these different confirmatory methods since, in the case of the selective liquid media methods, the production in them of gas is accepted, as in practice, to be the final indication of the presence of coliform organisms.

It will be observed that the usual "completed test," following lactose broth presumptives, detected the presence of coliforms in only 86 per cent of the sample portions which were proved to contain them. Of the selective media, the brilliant green bile indicated the presence of the group in 96.1 per cent, crystal violet broth in

TABLE IV

Results of 5 Methods of Confirmation of 6,043 Lactose Broth Presumptives in Percentages of Total of Sample Portions (3,628) from Which Coliform Organisms Were Isolated by One or More of 5 Methods

Complete Procedure	Confirmations Per cent of 3,628	Coliform Organisms Isolated Per cent of 3,628
LBP + 5 procedures	100.0 (isolations)	100.0 isolations
LBP + SMC "	86.2 "	86.2 "
" + FR	112.9 (gas +)	88.2 "
" + BG	96.1 (gas +)	84.7 "
" + CV	103.1 (gas +)	85.5 "
" + F	104.9 (gas +)	84.7 "

103.1 per cent, fuchsin broth in 104.9 per cent and formate ricinoleate broth in 112.9 per cent of the number of sample portions known to contain coliforms. The aggregate results suggest, therefore, that all of the selective liquid media confirmatory methods yielded results which were closer to the truth than were the results of the "completed test" procedure. If isolation of coliforms is required, however (in accordance with the alternative method, offered by the last edition of *Standard Methods*, of conducting the "completed test"), the last column of Table IV shows that the formate ricinoleate yielded the greatest proportion (88.2 per cent), and the other 4 methods 85 or 86 per cent of the number of isolations effected by all methods combined. Evidently, according to Table IV, the brilliant green bile, the crystal violet broth, and the fuchsin broth methods were the best of the 4 liquid media confirmatory procedures, and were also superior to the usual "completed test."

THE FIVE CONFIRMATORY PROCEDURES (INDIVIDUAL RESULTS)

Thus far, only the aggregate results reported by the collaborating laboratories have been considered. Comparable aggregate results, however, may conceal wide variations in the incidence of gross errors in the results secured from individual samples or groups of samples. It is impracticable to reproduce here the detailed results obtained from each individual sample, but as an approximation to such a tabulation, and in order to avoid the counterbalancing of negative and positive errors which occurs in the compilation of aggregates, the following device is employed: the difference between the number of positives indicated by each method of confirmation and the number of sample portions from which, by any method, coliforms have been isolated, is computed for each sample; all positive differences are summed to give a total which is designated as the "positive cumulative error," and all negative differences are likewise summed to give the negative cumulative error. For example, if, through the use of all of the confirmation methods, coliform organisms are isolated from 5 portions of a sample, whereas the crystal violet confirmation method indicates 7 portions to be positive, the error due to the use of the crystal violet method is recorded as + 2. All such results are added together to give the positive cumulative

TABLE V

Cumulative Errors of Results from 5 Confirmatory Procedures Comparing the Usual Standard Methods "Completed Test" (SMC) with Various Liquid Confirmatory Procedures (BG, CV, F, FR) as Employed in Practice, viz., Presence of Gas Alone Is Considered to Constitute Confirmation

		Confirmatory Procedures									*Total Coliforms Isolated*
			BG		*CV*		*F*		*FR*		*by One or*
No. of Samples	*Reported by*	*SMC*	+	—	+	—	+	—	+	—	*More of 5 Methods*
945	19 laboratories	365	105	166	214	145	292	180	351	50	2,684
		13.6	3.9	6.2	8.0	5.4	10.9	6.7	13.1	1.9	100%
158	Quebec	134	5	133	41	42	53	46	116	12	524
1,103	20 laboratories	499	110	299	255	187	345	226	467	62	3,208
110	Ontario (Tor.)	5	49	0	48	2	58	1	64	0	420
1,213	21 laboratories	504	159	299	303	189	403	227	531	62	3,628
		13.9	4.4	8.2	8.4	5.2	11.1	6.3	14.6	1.7	100%

error of the crystal violet method. It is to be noted that only the presumptives of the selective media enter into this comparison for they alone are usually available in practice. It is also to be observed that since the usual "completed test," unlike the selective methods, does not record non-confirming lactose broth presumptives as positives, there can be no positive cumulative error referable to the usual "completed test."

Table V shows the cumulative errors of the results obtained, by each confirmatory method, from the 1,213 samples. Because of the large proportional contributions of the Ontario (Toronto) and Quebec laboratories and because their results occupy opposite and rather extreme positions in the series, they are tabulated separately.

In terms of these cumulative errors, two essential requirements of any presumptive confirmatory procedure, intended to replace the usual "completed test," are: (1) Its positive cumulative error must be very small compared with the total number of sample portions shown to contain coliform organisms; otherwise too many water supplies will be unjustly suspected. (2) Its negative cumulative error must be as small as possible and, preferably, not greater than that of the usual "completed test"; otherwise too many instances of contamination may be overlooked.

Keeping in mind these two requirements, a rapid survey of the first series of figures of Table V shows at once that, for the first group of 19 laboratories, the confirmation method of choice is that which employs brilliant green bile. Its positive error is only 3.9 per cent of all of the coliform isolations, and its negative error of 6.2 per cent is less than half that of the usual "completed test." The use of certain of the other methods leads to even smaller negative errors but, on the other hand, introduces larger positive errors.

Quebec's brilliant green bile negative error is about the same as its usual "completed test" negative error, and its positive error is 5, or less than 1.0 per cent.

Ontario (Tor.), however, seldom encountered failure in its use of the usual "completed test" (its negative error is less than 1.0 per cent, compared with

TABLE VI

Cumulative Errors of Results from 5 Confirmatory Procedures as Percentages of Total of Sample Portions Containing Coliform Organisms (Isolated by 1 or More of 5 Methods)

Waters Type	Number of Samples	Number of Laboratories	SMC	BG		CV		F		FR		Total Coliforms Isolated by 1 or More of 5 Methods
			—	+	—	+	—	+	—	+	—	
All types (includes 60 unclassified)	1,213	21	13.9	4.4	8.2	8.4	5.2	11.1	6.3	14.6	1.7	3,628
Streams	150	15	11.5	3.5	4.4	5.0	2.5	4.9	3.3	8.6	0.4	793
Unfinished	193	9	20.7	3.4	7.6	10.3	5.9	18.0	3.8	20.9	1.9	473
Finished	306	13	29.2	9.4	25.5	49.1	19.8	108.5	12.3	76.4	17.0	106
Springs	69	11	23.1	6.9	18.8	11.5	6.9	9.2	9.6	20.0	2.3	260
Wells	308	16	10.0	3.8	7.8	5.1	4.7	4.8	7.6	9.7	1.6	1,595
Lakes	110	5	16.6	1.3	7.6	4.9	8.5	6.7	5.8	9.0	0.0	223
Sea Water	6	2	17.1	2.9	2.9	0.0	2.9	0.0	5.7	5.7	2.9	35
Reservoirs and pools	11	1	11.4	5.7	11.4	0.0	17.2	31.4	2.9	31.4	0.0	35

TABLE VII

Cumulative Errors of Results Obtained by Collaborating Laboratories, from 5 Confirmatory Procedures, in Percentage of Total Number of Sample Portions Shown to Contain Coliform Organisms

			Confirmatory Procedures								
				BG		CV		F		FR	
Laboratory	No. of Samples	No. of Presump.	SMC —	+	—	+	—	+	—	+	—
Arizona	14	48	14.6	4.2	10.4	0.0	16.6	22.9	4.2	22.9	0.0
Connecticut	27	90	14.4	12.2	7.8	22.2	1.1	14.4	5.6	23.3	0.0
California	14	93	0.0	0.0	0.0	0.0	10.8	0.0	10.8	0.0	0.0
Georgia	52	94	19.2	11.7	4.3	24.5	3.2	14.9	6.4	50.0	2.1
Indiana	47	455	5.9	2.9	4.8	3.3	3.1	1.5	8.4	3.5	0.9
Kansas	83	205	7.8	3.4	8.8	7.3	7.8	16.1	4.4	17.6	1.0
Minnesota	78	70	10.0	8.6	7.2	21.4	2.9	53.0	2.9	18.6	1.4
New Jersey	37	193	1.6	0.5	1.6	0.5	1.6	0.5	3.1	0.5	1.6
New York	90	326	21.2	5.5	10.1	7.1	7.7	2.8	14.7	17.2	2.1
Ohio	31	134	21.6	2.2	7.5	6.0	3.7	3.0	16.4	4.5	7.5
S. Dakota	23	61	0.0	3.3	11.5	0.0	11.5	14.8	4.9	9.8	9.8
Ontario—Tor.	110	420	1.2	11.7	0.0	11.4	0.5	13.8	0.2	15.2	0.0
" —Ft. W.	15	17	70.6	17.6	23.8	47.0	17.6	100.0	0.0	105.9	5.9
" —N. B.	5	35	22.8	0.0	5.7	0.0	0.0	0.0	2.9	5.7	5.7
Quebec	148	524	25.6	1.0	25.4	7.8	8.0	10.1	8.8	22.2	2.3
Birmingham, Ala	47	208	16.4	2.9	4.8	9.1	2.9	7.2	1.9	18.8	0.5
Chicago, Ill.	129	176	15.9	1.7	5.7	4.5	11.4	12.5	8.0	8.5	1.1
Decatur, Ala.	19	74	0.0	2.7	0.0	0.0	0.0	1.4	1.4	8.1	1.4
Indianapolis, Ind.	70	117	8.6	3.4	8.6	6.0	5.1	21.4	2.6	15.4	3.4
Minneapolis, Minn.	56	58	24.2	6.9	6.9	5.2	10.3	25.9	3.5	46.5	0.0
St. Louis, Mo.	118	230	30.4	3.9	5.2	21.3	4.8	25.6	1.7	5.6	1.7
	1,213	3,628	332.0	106.3	160.1	204.6	130.6	361.8	112.8	419.8	48.4
Average			15.8	5.1	7.6	9.7	6.2	17.2	5.4	20.0	2.3

that of 15.5 per cent for the total of the other 20 laboratories). Its brilliant green bile negative error is 0.0 per cent and its positive error 11.7 per cent.

The cumulative errors, in percentages of the total numbers of coliform organisms isolated by all procedures from the different types of waters (when these were clearly designated) are shown in Table VI.

Particular attention is directed to the results obtained from the "finished" waters, which include final treated or filtered-treated waters. It is evident that the usual "completed test" failed to detect the organisms in about 29 per cent of the presumptives in which they were present. Again the brilliant green bile results are quite favorable: although the positive error is 9.4 per cent, the negative error is only 25.5 per cent, 3.7 less than that of the "completed test." The positive errors due to the use of crystal violet, fuchsin, and formate ricinoleate broths, with this class of water, are rather striking.

Table VII shows the cumulative errors, positive and negative, due to the use of each of the 5 confirmatory procedures, of the results from each laboratory, in terms of percentages of the total numbers of sample portions from which, by any method, coliform organisms were isolated. The average of these percentages is also shown.

It will be observed that the results of the great majority of the laboratories follow the same general trend: the brilliant green bile positive error is not excessive and its negative error is less

than the usual "completed test" error. Although the crystal violet negative error is often less than that of the brilliant green bile, its positive error is usually greater, and often considerably greater (especially when this medium is employed with unfinished and finished waters); the fuchsin broth errors are irregular often more pronounced than are those of the other 3 methods; and the formate ricinoleate positive error is nearly always excessive, although its negative error is usually rather small. On the whole, the results indicate that the brilliant green bile method proved as a rule the best of the 5 methods; more frequently than did any of the other methods, it yielded a number of positives approximating the number of sample portions from which, by some method, coliform organisms were isolated. The results reported by the purification plants, as a group, particularly favor the choice of the brilliant green bile method.

DISCREPANCIES BETWEEN RESULTS FROM BORDER-LINE SAMPLES

Since the border-line samples, or those samples from which was obtained some indication of the presence of small numbers of coliform organisms, are of special interest, Table VIII has been prepared. This table shows, first, all the discrepancies which occurred in the results obtained by means of the different confirmatory methods when, although the sample yielded lactose broth presumptives, one or more of the methods gave an indication of the absence of coliform organisms from the sample.

It is to be observed, in this table, that 283 treated, filtered, or filtered-treated waters, which yielded lactose broth presumptives, were found by all methods to contain no coliform organisms. But the brilliant green bile method of confirmation (gas only signifying the presence of the organism) gave, 3 times, a false indication of 2 coliforms per 100 c.c.; it never, however, gave a false indication of "more than 2" coliforms per 100 c.c. of sample. The crystal violet method gave a false indication of 2 per 100 c.c. 17 times, and of more than 2 per 100 c.c. 6 times. The fuchsin broth and formate ricinoleate broth gave many false indications of both types. Considering now all classes of waters and excluding only the Ontario (Tor.) results, of 391 samples from

TABLE VIII

Certain Discrepancies in Results Obtained by Various Confirmatory Methods When One or More Methods Indicated Absence of Coliform Organisms from Sample

	Coliform Density by All Methods=0 per 100 c.c.									*Coliform Density by All Methods=>2 per 100 c.c.*					
Type of Samples and Number of Laboratories Reporting	*Number of Samples with LBP Presumptives*	*Coliforms=2/100 c.c. by Gas Only in*				*Coliforms=>2/100 c.c. by Gas Only in*				*Number of Samples with LBP Presumptives*	*Coliforms=0 per 100 c.c. by*				
		BG	*CV*	*F*	*FR*	*BG*	*CV*	*F*	*FR*		*Gas Only in BG*	*CV*	*F*	*FR*	*SMC Completed*
T, F or FT waters															
13 laboratories	283	3	17	33	16	0	6	19	25	92	4	1	1	0	8
Natural waters															
10 laboratories	108	7	14	15	16	1	11	6	10	271	10	3	7	0	10
Totals	391	10	31	48	32	1	17	25	35	363	14	4	8	0	18
		2.6%													
Natural waters															
Ontario—Tor.	45	8	7	8	5	6	6	7	10	52	0	0	0	0	0
Grand total	436	18	38	56	37	7	23	32	45	415	14	4	8	0	18

which no coliform organisms were isolated, 10, or only 2.6 per cent, were indicated by brilliant green bile to contain 2 per 100 c.c., and only one sample to contain more than 2 per 100 c.c. The Ontario (Tor.) results are quite different: the corresponding proportions are 17.8 per cent and 13.3 per cent.

On the other hand, the second section of Table VIII shows that when the coliform density was greater than 2 per 100 c.c., of 92 treated, filtered, or filtered-treated waters, the brilliant green bile failed to indicate the presence of coliforms in 4; but it is to be noted that the "completed test" failed in 8. Again considering all classes of water and again excepting the Ontario (Tor.) results, brilliant green bile evidently failed to indicate the presence of coliforms, in samples which contained more than 2 per 100 c.c., in 14 of 363 samples, or 3.9 per cent, whereas the "completed test" similarly failed in 18 samples, or 5.0 per cent. Ontario (Tor.) reported no failures, by any method, of this character. It may be noted, in this connection, that the Minnesota laboratory examined a number of samples of Minneapolis tap water (filtered-treated), testing 10 portions of *100 c.c.* of each sample; 68 of these samples yielded lactose broth presumptives. From 8 of the 402 presumptives coliform organisms were isolated by the use of all methods combined. The usual "completed test" gave 6 positives, and the brilliant green bile 12 gas positives, from which 7 isolations were obtained.

It is evident, therefore, from this study of the results secured from border-line samples that in general the brilliant green bile method was superior to the other selective procedures for the confirmation of lactose broth presumptives from such samples. Furthermore, the results indicate that there was very little difference between the results obtained by the brilliant green bile method and those obtained from the usual "completed test": the rapid method gave a few false positives, but a smaller number of false negatives than did the more arduous procedure.

It must be concluded from the results of this study of the 5 confirmatory procedures that whether viewed from the standpoint of the comparative aggregate results, the comparative individual results expressed in terms of "cumulative errors," or the comparative results obtained from border-line samples, the brilliant green bile appears to be the best of the 4 liquid selective media for use in the simplified "confirmed" procedure. To be sure, groups of results reported by some collaborating laboratories may not entirely support this conclusion; a rather remarkable feature of the series of reported results, however, is that so many *do* support it. Likewise remarkable is the agreement of so many laboratories, as indicated by their reported results, that the brilliant green bile "confirmed test" not only suffered very little in comparison with the usual "completed test," but very often proved to be the more satisfactory of the two. It has already been shown that the number of isolations of coliform organisms secured from the brilliant green bile presumptives compared very favorably with the number of isolations from the lactose broth presumptives (98.4 per cent of the latter). Evidently the inclusion in the last edition of *Standard Methods,* of this alternative method for the "completed test" was, to judge from these figures, quite justified. Even when applied to the examination of finished waters, the 1,175 lactose broth presumptives yielded 75 positives by the "completed test," 89 gas positives by the brilliant green bile method, and 74 isolations from these brilliant green bile presumptives, whereas all methods combined permitted 106 isolations.

Obviously these figures suggest that the brilliant green bile method of con-

firmation (followed, if required, by attempted isolation of coliform organisms from the brilliant green bile presumptives) might advantageously be substituted for the usual "completed test" even in the examination of finished waters.

II Comparison of the Two Primary Media: Lactose Broth and Fuchsin Broth

It will be remembered that, for this comparison, usually 10 portions of sample were planted in primary lactose broth and 10 portions in fuchsin broth, and any presumptives which appeared in either medium were submitted to the "completed test"; in addition, the lactose broth presumptives were also confirmed by the 4 selective liquid media methods. The number of samples examined in this manner numbered 890.

The results obtained from these 2 methods of examination are shown, in the aggregate (together with the results of confirmation of the lactose broth presumptives from the same samples by the use of the 4 selective liquid media) in Table IX.

It is evident, from the second column of this table, that the number of fuchsin broth presumptives was 69.1 per cent of the number of lactose broth presumptives, a reduction of 31 per cent. On the other hand, when complete confirmation was practised, coliform organisms were isolated from only 70.5 per cent of the fuchsin broth presumptives; the resulting number of isolations, however, was 2,048, or 97.1 per cent of the number of isolations obtained by the use of the usual "completed test." Evidently these results are more favorable than those which reported relative productivity tests of fuchsin broth with pure cultures would lead one to expect; the inhibition of coliform organisms by this medium appears to be very slight when they are accompanied by the mixed bacterial flora of natural waters. This fuchsin broth primary method, however, requires the employment of the "completed test" and since, on the average, the number of presumptives in this series of examinations was reduced by only 31 per cent, the advantage of substitution of the fuchsin broth for the lactose broth in the *Standard Method* was not very marked.

It was hoped that the fuchsin broth might prove satisfactory in a direct presumptive method which would not require confirmation of presumptives. But according to Table IX, the fuchsin

Table IX

Results of Examination of 890 Water Samples by 6 Different Procedures

Procedure	Presumptives		Portions from Which Coliforms Were Isolated *		
	No.	*Per cent of LBP Presumptives*	*No.*	*Per cent of Positive Presumptives*	*Per cent of LBP+SMC Positives (2,110)*
Fuchsin Broth (+SMC)	2,903	69.1	2,048(4)	70.5	97.06
LBP (+SMC)	4,204	100.0	*2,110*	50.2	100.00
" +BG (+SMC)	2,384	56.7	2,079(3)	87.2	98.53
" +CV (+SMC)	2,592	61.7	2,109(3)	81.4	99.95
" +F (+SMC)	2,650	63.1	2,107(6)	79.5	99.86
" +FR (+SMC)	2,894(5)	68.9	2,168(6)	74.9	102.75

Note: The figures in parentheses (which are included in the adjoining totals) indicate the number of missing tubes, incomplete tests, etc., considered positive in order to avoid loss of remaining data obtained from certain samples.

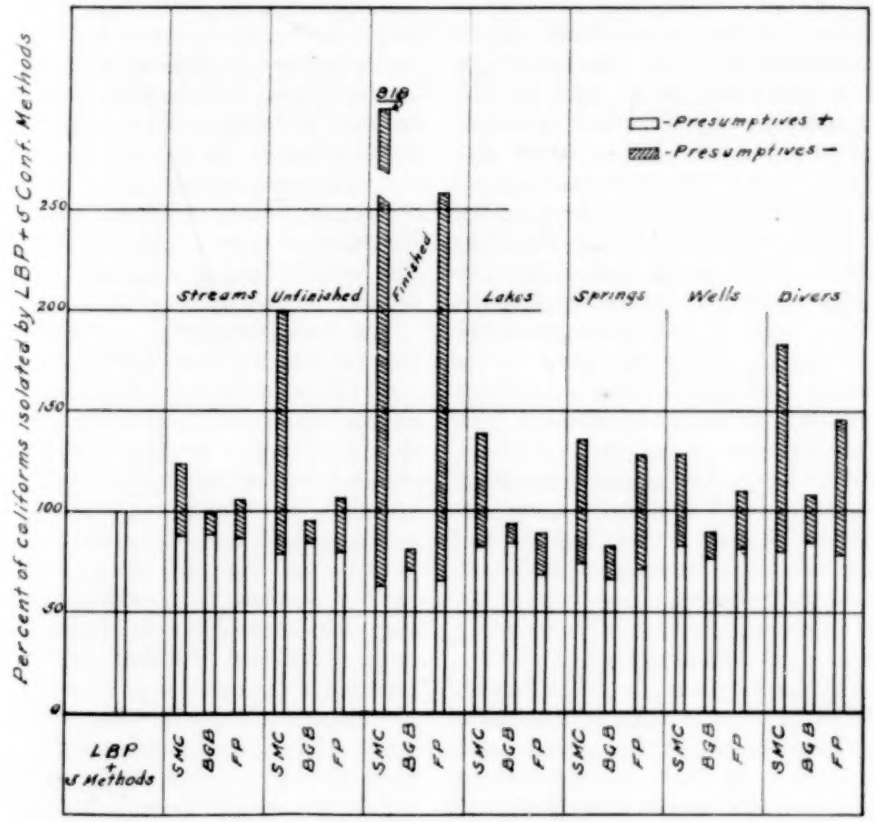
* The lactose broth presumptives from which coliform organisms were isolated by 1 or more of 5 confirmatory methods, numbered 2,545.

TABLE X

Comparison of Results of Examination of 890 Water Samples by 4 Coliform Procedures

		1	2		3		4	
			Usual Completed Test		Brilliant Green Bile Confirmatory Procedure		Fuchsin Broth Primary	
Waters	Number of Samples with Presumptives	Number of Isolations by Lactose Broth Primary and 5 Confirmatory Procedures	LBP Presump. Per cent of Column 1	Isolations Per cent of Column 1	BG Presump. Per cent of Column 1	Isolations Per cent of Column 1	FP Presump. Per cent of Column 1	Isolations Per cent of Column 1
Streams	140	728	124	88	99	88	106	86
Unfinished	187	462	198	79	96	85	107	81
Finished	192	81	818	64	81	72	258	66
Lakes	110	223	139	83	94	85	89	69
Springs	61	231	136	75	83	67	128	72
Wells	175	749	129	84	90	77	110	82
Divers	25	71	183	83	108	86	146	79
Total	890							

FIGURE I—Comparison of Results of Examination of 890 Water Samples by 4 Coliform Procedures



broth presumptives numbered 2,903, whereas the number of portions containing coliforms, as revealed by lactose broth plus the use of 5 confirmatory methods, was only 2,545. Apparently the fuchsin broth primary presumptives included a considerable number of false positives, as was also found to be the case when it was employed as a confirmatory medium.

Since the great majority of the collaborating laboratories reported results similar to the aggregate results described above, no attempt is made to describe the individual results obtained with the fuchsin broth. Apparently it yields very satisfactory results with some waters, but proves unsatisfactory for the examination of others.

Table X and Figure I present a comparison of the results obtained from 890 samples, classified according to type of water, employing 4 methods of examination: the lactose broth plus 5 confirmatory methods, the results of which are taken as a basis for the comparison; the *Standard Methods* completed test, the lactose broth with brilliant green bile confirmation, and the fuchsin broth primary method. The figure shows very clearly that the method which yields the most satisfactory results is that which employs lactose broth with brilliant green bile confirmation, taking gas alone in the latter to indicate presence of coliform organisms. It shows also, however, that if confirmation is for any reason required, this method yields a number of isolations which is usually about the same as, or greater than that obtained by attempted isolation from the lactose broth presumptives.

DISCUSSION

For many years past, the *Standard Methods* procedure for the detection of the presence of coliform organisms in water has specified primary planting of the sample into lactose broth with the view evidently to securing, through the use of a simple, non-inhibitive medium, the multiplication of as many as possible of the various types of coliform organisms which may be contained in water. The propriety of this policy will not be discussed here, except to note that, as measured by the continued reduction of enteric disease incidence on this continent, no small measure of success has followed its adoption; and that, in view of the recent suspicion cast upon the adequacy of the present *Standard Methods*, because of the occasional occurrence of gastrointestinal infection in communities supplied with water declared upon examination by means of these methods to be safe, disregard of the presence in water of any coliform organism which multiplies in lactose broth, does not appear to be warranted at the present time. It is obvious, however, that if this policy is accepted, every instance of multiplication of coliform organisms in lactose broth presumptives must, if possible, be recognized. In other words, the estimate of the coliform density of a sample must include, in so far as is practicable, every coliform organism, regardless of type or degree of attenuation, which has produced gas in the primary lactose broth.

The " completed test " includes some features which are so speculative and other features so dependent, for their effectiveness, upon the personal element, that it is subject to error, varying according to the aggregate results reported by the laboratories collaborating in the present study from 0.0 per cent to 30.4 per cent of the number of sample portions from which coliform organisms were isolated. It is to be remembered that Ruchhoft and Noble reported a similar error of about 26 per cent when working with Chicago treated water. The " completed test," moreover, is costly—much labor and material are required—and because of

this fact another speculative procedure must be introduced in practice: the choice of one or, at most, of very few of the lactose broth presumptives for confirmation. Whether the presumptive (or presumptives) chosen is or is not one of those which contains coliform organisms, is often the result of chance alone.

Chance and the personal element involved in fishing colonies from an Endo or E.M.B. plate are almost entirely eliminated by the substitution, for the "completed test," of a liquid medium confirmatory method. Such a method is so simple that a minimum of experience on the part of the technician is required. The results are clean-cut, positive or negative. Identical results should practically always be obtained by different workers from the same presumptive. For this test, however, a suitable medium must be employed.

The results of the present study of several liquid confirmatory media indicate that brilliant green bile (2 per cent) will serve, in the great majority of laboratories, as a reliable medium for use in the simpler confirmatory procedure. That its use yields results which in general strike as close or closer to those obtained through the use of several procedures than does the "completed test," has been shown by the comparative additive errors, positive and negative, of the results obtained from the individual samples examined and by a detailed study of the results secured from the important group of "border-line" samples, or samples containing few or no coliforms but from which lactose broth presumptives were secured.

Probably no confirmatory method can be expected to give uniform results throughout the continent. The results reported here indicate variations of bacterial flora in different areas which are sometimes rather striking. Despite the obvious existence of such difficulties in the way of the choice of a confirmatory method, the brilliant green bile procedure is reported, with surprising accord, to constitute the most satisfactory of all the procedures studied. The presumptives of many finished waters, a group notoriously difficult of confirmation, appear to yield, through the use of the brilliant green bile "confirmed test," results nearly as satisfactory as those secured by the employment of a "completed test."

Furthermore, practically all the collaborating laboratories reported about the same numbers of isolations obtained from the brilliant green bile presumptives as were obtained from the lactose broth presumptives. As a consequence, when the simpler confirmatory method is used, there is always available, in special cases, the "complete" confirmation of the bile presumptives which usually yields results comparable to those obtained by attempted isolation from the lactose broth presumptives.

It may be concluded, therefore, that the results of this study indicate that the brilliant green bile confirmatory method is unquestionably the most generally satisfactory of the selective media confirmatory procedures described in the last edition of *Standard Methods of Water Analysis* and that it yields results which, with the possible exception of those obtained from finished waters, are usually more accurate than are those secured by the use of the "completed test." The utility of its application to the confirmation of presumptives from finished waters is still an open question. The results of "complete" confirmation of the brilliant green bile presumptives here reported, however, whether obtained from finished or other waters, serve to justify the inclusion in the last edition of *Standard Methods* of this alternative method of performing the "completed test." Evidently much time and labor usually may be saved by employing

the rapid brilliant green bile confirmatory test and accepting, at least for the moment, the implications furnished by the results; rarely, it appears, will this practice lead to an underestimate of the coliform density of a water; and if the density indicated is considered excessive, complete confirmation of the brilliant green bile presumptives may be expected to yield quite as many isolations as will complete confirmation from lactose broth.

It may be concluded also, from the results of this study, that fuchsin broth, when employed as a direct presumptive primary medium, very often yields an excessive number of presumptives, but when followed by "complete" confirmation, the number of isolations of coliform organisms closely approaches that secured through the use of the lactose broth primary and the "completed test." The proportion of isolations, however, only 70.5 per cent of the fuchsin broth presumptives (compared with that of 52.2 per cent of the lactose broth presumptives), is not sufficiently promising to warrant its general adoption, despite the fact that, when employed with some waters, the results are very satisfactory.

SUMMARY

Twenty-one laboratories situated in the United States and Canada have collaborated in a study of 6 different methods for the detection of the presence of coliform organisms in water. A total of 1,213 samples of water from which lactose broth presumptives were obtained, was examined, employing 5 different methods of confirmation of these presumptives: the "completed test" of *Standard Methods of Water Analysis*, and 4 liquid media methods employing, respectively, brilliant green bile, crystal violet, fuchsin, and formate ricinoleate broths. Fuchsin broth was also used as a primary medium in the examination of 890 of the above samples.

The results reported by the collaborating laboratories indicated the brilliant green bile confirmatory method to be the most generally satisfactory of the selective procedures. The results also indicated that the brilliant green bile method compared very favorably with the usual *Standard Methods* "completed test" and, for the examination of most waters, might advantageously replace it. The results obtained from finished waters suggest the use with such waters, of the alternative "completed test" procedure of *Standard Methods:* the employment of the brilliant green bile confirmatory method, followed by attempted isolation of coliform organisms from presumptives of this medium, instead of the "completed test" of lactose broth presumptives, in order to eliminate much of the labor involved in the latter procedure.

The results obtained from the use of fuchsin broth, whether as a direct presumptive medium or as a primary medium replacing lactose broth, were not so generally satisfactory as those secured through the use of lactose broth followed by the brilliant green bile "confirmed test" or "completed test."

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Milk-Borne Streptococcic Infections*

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DETAILED clinical and epidemiological observations were made by members of the staff of the Division of Communicable Diseases of the New York State Department of Health in 7 milk-borne epidemics of streptococcus infection comprising 1,529 cases and 24 deaths occurring in the 3 year period 1934–1936. Three of the epidemics studied, consisting of 806 cases and 16 deaths, were classified clinically as scarlet fever, and 4 epidemics, consisting of 723 cases and 8 deaths, were classified as septic sore throat. An analysis was made of data obtained during the investigation of these 7 epidemics, with special reference to the clinical and immunological characteristics of the streptococcus infections observed.

All the epidemics occurred in villages of less than 6,000 population, and in each instance the incriminated milk supply was one of raw milk or cream. The generally accepted identifying characteristics of milk-borne epidemics were observed in each outbreak. All the epidemics were explosive in character; in each outbreak elimination or pasteurization of the incriminated milk supply was followed by a marked decline in case incidence. As shown in Table I, each epidemic was charac-

TABLE I

Summaries of 3 Milk-borne Scarlet Fever Epidemics and 4 Milk-borne Septic Sore Throat Epidemics, New York State, 1934–1936

Type and Location of Epidemic	*Number of Cases*	*Number of Deaths*	*Per Cent of Cases 15 Years of Age or Over*	*Cases per 100 Quarts of Milk Sold Daily by Incriminated Dairy*	*Cases per 100 Quarts of Milk Sold Daily by All Other Dairies*
Scarlet fever					
Owego	532	8	71.4	145.0	5.9
Wellsville	201	6	68.8	27.2	1.1
Red Creek	73	2	69.8	45.0	2.5
Septic sore throat					
Baldwinsville	500	7	75.3	107.1	4.3
Corfu	112	0	75.0	88.7	8.2
Dryden	56	1	87.5	62.4	1.9
Waterloo	55	0	70.7	51.0	0.3

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 6, 1937.

terized by an age distribution typical of milk-borne outbreaks, a higher proportion of cases occurring among adults than among children. An overwhelming majority of the cases in each epidemic occurred among patrons of a single dairy as shown in Table I by case rates per 100 quarts of milk among customers of the implicated dairy and among customers of all other dairies.

Efforts to determine the source of contamination of the milk supply resulted in the discovery of acute mastitis in members of the producing herds in 6 of the 7 epidemics. The organism isolated from milk produced by the cows suffering from mastitis in each instance was found to be a hemolytic streptococcus of the type usually associated with human infection (Lancefield's Group A) [1] and was indistinguishable from the organism isolated from throat cultures obtained from typical cases observed in the same epidemic. In 5 of the 7 outbreaks, acute cases, or recent illnesses, strongly suggestive of hemolytic streptococcus infection were found to have occurred among the milkers or milk handlers associated with the producing herds, the date of onset of the infection in the milk handler always preceding the development of acute mastitis in the cow. In the one epidemic where examination of the producing herd revealed no acute mastitis, it was found that the milk had been bottled and capped by hand by a person suffering from an acute sore throat.

Evidence of transmission of streptococcus infection by personal contact in milk-borne outbreaks is frequently obscure. This lack of evidence is probably due to the almost universal exposure of members of households in which the contaminated milk supply is used, resulting in the simultaneous infection of nearly all susceptible persons in the household. In 2 of the epidemics studied, one of scarlet fever and one of septic sore throat, there was a considerable number of instances in which the original case in the family was a worker in a factory where the incriminated milk was regularly served but whose household contacts had no known exposure to this milk supply. In these families there was evidence of transmission of infection by direct personal contact similar to that observed in epidemics of scarlet fever in which dissemination appeared to be solely by personal contact. A comparison of the secondary attack rates in such a group in the Owego scarlet fever epidemic, with the attack rates observed in a contact epidemic of scarlet fever in Binghamton, New York, is shown in Table II. A secondary attack rate of 20 per cent was observed among 50 such household contacts in the Baldwinsville epi-

TABLE II

Secondary Attack Rates by Age Among Household Contacts (1) in a Contact Epidemic of Scarlet Fever and (2) in a Milk-borne Epidemic of Scarlet Fever Where the Primary Case Occurred in a Consumer of the Incriminated Milk Supply But Where the Members of the Household Had Not Consumed the Incriminated Milk

	Contact Epidemic Binghamton		*Milk-borne Epidemic Owego*		*Secondary Attack Rate Per Cent*	
Age Group	*Persons Exposed*	*Number of Cases*	*Persons Exposed*	*Number of Cases*	*Contact Epidemic*	*Milk-borne Epidemic*
0–14	465	93	73	10	20.0	13.7
15 and over	773	41	192	14	5.3	7.3
Total	1,238	134	265	24	10.8	9.0

demic of septic sore throat. These findings suggest that streptococcus infections occurring in milk-borne epidemics are as readily transmitted by direct contact as are similar infections seen as sporadic cases or in epidemics in which there is no evidence of a common source of infection.

CLINICAL CHARACTERISTICS

The clinical manifestations of the illnesses observed in the various outbreaks were strikingly similar with the exception of the presence or absence of a characteristic scarlet fever rash and desquamation. Almost without exception the patients suffered from sore throat with fever of from 100° F. to 104° F., general malaise, and varying degrees of prostration. The throat was almost invariably red and frequently edematous. A punctate rash was frequently seen on the palate both in epidemics classified as scarlet fever and as septic sore throat. The tonsils were red and swollen and frequently covered with exudate. The anterior cervical lymph glands were almost invariably enlarged and tender. In the 3 epidemics classified as scarlet fever, a typical scarlet fever rash was observed in approximately 60 per cent of the cases, but a significantly higher incidence of the rash was noted in children than in adults. Eighty per cent of the scarlet fever patients under 15 years of age developed a rash as compared with 50 per cent of those 15 years of age or over. In almost all cases the rash was followed by desquamation. Those patients developing a rash were clinically indistinguishable from sporadic cases of scarlet fever or cases of scarlet fever observed in contact epidemics. Cases in which no rash was observed occurring in epidemics classified as scarlet fever were clinically indistinguishable from cases occurring in the epidemics of septic sore throat. Scarlet fever cases without rash and cases of septic sore throat were also clinically indistinguishable from the type of case frequently seen in the absence of any epidemic and usually diagnosed as severe tonsillitis.

COMPLICATIONS

Approximately 25 per cent of the patients seen during each epidemic developed one or more serious complications. The complications most frequently encountered were: arthritis and rheumatism, otitis media, mastoiditis, quinsy, cervical abscess, nephritis, pneumonia, sinusitis, and erysipelas. The same complications were observed

TABLE III

Complications Observed in Milk-borne Epidemics of Septic Sore Throat in Baldwinsville and Dryden and of Scarlet Fever in Owego and Wellsville

	Scarlet Fever		*Septic Sore Throat*	
Complications	*Number of Cases*	*Per cent*	*Number of Cases*	*Per cent*
Arthritis and rheumatism	59	8.2	69	13.1
Otitis media and mastoiditis	48	6.6	50	9.5
Quinsy	26	3.6	48	9.1
Cervical abscess	2	0.3	15	2.8
Nephritis	11	1.5	6	1.1
Pneumonia	6	0.8	5	1.0
Sinusitis	24	3.3	4	0.8
Erysipelas	11	1.5	6	1.1
Number of cases observed	723		526	
Cases with one or more complications	180	24.9	130	24.7

in all 7 epidemics and, as shown in Table III, these complications occurred with approximately the same frequency in scarlet fever and septic sore throat outbreaks.

There were 16 deaths among the 806 cases of scarlet fever, and 8 deaths among the 723 cases of septic sore throat. Eleven of the 16 deaths in scarlet fever epidemics occurred during the 1st week of the illness, 1 in the 2nd week and 4, 4 weeks or more after the onset of the original infection. Of the 8 deaths in septic sore throat outbreaks, only 2 occurred in the 1st week of the illness, 1 in the 2nd, 1 in the 3rd, and 4 occurred 4 weeks or more after the onset of the primary infection. Complications were given as contributory causes of death in 12 of the 16 deaths occurring in scarlet fever outbreaks. Of the 8 deaths occurring in septic sore throat epidemics, all were among individuals suffering from a complication of the original infection.

SUSCEPTIBILITY

The occurrence of relatively large numbers of cases of streptococcus infection within short periods of time and in limited areas presented unusual opportunities to study the various factors which might be expected to influence susceptibility to infection. There was no evidence of difference in susceptibility to infection by sex. The age distribution of cases corresponded closely to the age distribution of the population of the community in which the particular epidemic occurred, indicating no difference in susceptibility according to age, either in scarlet fever or in septic sore throat epidemics.

The quantity of infectious material consumed, however, did influence the probability of infection. In 4 epidemics, a milk census was taken, either of the entire village in which the epidemic occurred or in a random sample of the population of that village, and data were obtained concerning the regular and supplementary milk supplies of the family, together with information as to the amount of milk consumed per day by each individual. Table IV shows attack rates according to quantity of milk consumed among patrons of the incriminated dairy in the Owego scarlet fever epidemic. The attack rates varied directly with the amount of milk consumed irrespective of age of the persons exposed. Milk census data in the other epidemics studied, both those of scarlet fever and of septic sore throat, showed the same increased probability of infection with increased milk consumption.

It has been generally assumed that scarlet fever produces subsequent immunity to infection in a considerable proportion of those attacked, but it has not been thought likely that scarlet fever produces immunity to septic sore throat. The effect of a previous attack of scarlet fever upon susceptibility to scarlet fever or septic sore throat was

TABLE IV

Attack Rates According to Age and Quantity of Milk Consumed per Day Among Regular Consumers of the Incriminated Milk—Owego Scarlet Fever Epidemic

	0–14		15 and Over		Attack Rate Per cent	
Average Daily Milk Consumption	Persons Exposed	Cases	Persons Exposed	Cases	0–14	15 and Over
None	17	2	90	15	11.8	16.7
1–7 oz.	29	8	227	57	27.6	25.1
8 oz. and over	203	84	230	95	41.4	41.3
Total	249	94	547	167	37.8	30.5

TABLE V

Attack Rates Among Persons Living in Households Where One or More Cases Occurred According to Age and History of Previous Scarlet Fever in Milk-borne Epidemics of Scarlet Fever in Owego, Wellsville and Red Creek and of Septic Sore Throat in Dryden and Waterloo

	Scarlet Fever Epidemics						Septic Sore Throat Epidemics					
	Previous Scarlet Fever		No Previous Scarlet Fever		Attack Rate Per cent		Previous Scarlet Fever		No Previous Scarlet Fever		Attack Rate Per cent	
Age Group	Number of Persons	Cases	Number of Persons	Cases	Previous Scarlet Fever	No Previous Scarlet Fever	Number of Persons	Cases	Number of Persons	Cases	Previous Scarlet Fever	No Previous Scarlet Fever
0–14	36	9	459	223	25.0	48.6	9	5	43	16	55.5	37.2
15 and over	263	101	1,000	434	38.4	43.4	45	20	129	59	44.4	45.7
Total	299	110	1,459	657	36.8	45.0	54	25	172	75	46.3	43.6

studied by means of household attack rates. Attack rates among persons living in households in which one or more cases occurred are given in Table V by age and according to history of previous scarlet fever for 3 epidemics of scarlet fever and 2 of septic sore throat. A previous attack of a streptococcus infection, diagnosed scarlet fever, apparently produced little or no immunity to subsequent infection with the hemolytic streptococcus associated with either milk-borne scarlet fever or septic sore throat epidemics. Scarlet fever patients who gave a history of a previous attack were apparently as severely ill as were those who denied having previously suffered from scarlet fever, case fatality rates and the incidence of complications being the same in the two groups. The only difference between these two groups appeared to be the proportion of cases in which a rash was observed. Less than 30 per cent of the patients previously attacked developed a rash, while nearly 65 per cent of those with no history of scarlet fever developed a rash.

It has been repeatedly demonstrated that an attack of scarlet fever usually results in reduced skin sensitivity to the toxin produced by the infecting hemolytic streptococcus. From 4 to 8 weeks after the peak of 2 of the scarlet

TABLE VI

Per cent Negative Skin Sensitivity Tests According to Age and History of Attack During the Milk-borne Epidemics of Scarlet Fever in Owego and Wellsville and of Septic Sore Throat in Baldwinsville and Corfu*

	Scarlet Fever Epidemics						Septic Sore Throat Epidemics					
	Ill		Not Ill		Per cent Negative		Ill		Not Ill		Per cent Negative	
Age Group	Number Tested	Number Negative	Number Tested	Number Negative	Ill	Not Ill	Number Tested	Number Negative	Number Tested	Number Negative	Ill	Not Ill
0–14	112	82	1,052	361	73.2	34.3	121	50	412	145	41.3	35.2
15 and over	164	142	410	193	86.6	47.1	116	61	190	100	52.6	52.6
Total	276	224	1,462	554	81.2	37.9	237	111	602	245	46.8	40.7

* Strain New York 5.

TABLE VII

Per cent Negative Skin Sensitivity Tests According to Age and History of Scarlet Fever in Various New York State Communities, 1934–1937*

Age Group	History of Scarlet Fever †		No History of Scarlet Fever		Per cent Negative	
	Number Tested	Number Negative	Number Tested	Number Negative	History of Scarlet Fever	No History of Scarlet Fever
0– 4	...	...	132	30	....	22.7
5– 9	232	162	2,816	882	69.8	31.3
10–14	284	216	2,713	1,194	76.0	44.0
15–19	83	66	751	351	79.5	46.7
20–29	23	20	139	62	87.0	44.6
30–39	16	14	62	30	87.5	48.4
40–49	13	13	32	21	100.0	65.6
50 and over	17	15	31	24	88.2	77.4
Total	668	506	6,676	2,594	75.7	38.8

* Strain New York 5

† Exclusive of cases of milk-borne epidemics

fever and 2 of the septic sore throat outbreaks, tests of skin sensitivity to a standard hemolytic streptococcus toxin (Strain New York 5) were made, both in individuals who had suffered an attack during the epidemic and in a comparable group who had not been ill. The results of these tests according to history of illness are given in Table VI.

The proportion of negative skin tests in the group who had recently recovered from scarlet fever was approximately twice that observed in the group tested in the same community who had not been ill during the epidemic. Among scarlet fever patients equally high percentages of negative tests were observed in those who did not develop a rash and in those who had a typical scarlet fever rash. Among those tested fol-

TABLE VIII

Per cent Positive Skin Sensitivity Tests by Age Among Persons Tested in New York State, 1934–1937, and Per cent of Cases with Rash Among Scarlet Fever Patients in Milk-borne Epidemics in Owego, Wellsville and Red Creek*

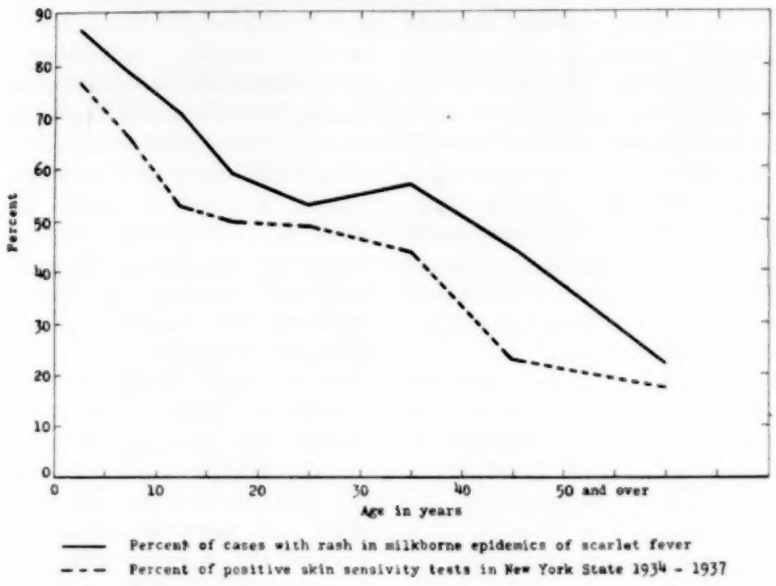
Age Group	Skin Sensitivity Tests † New York State, 1934–1937			Scarlet Fever Cases in Milk-borne Epidemics According to Rash		
	Number Tested	Number Positive	Per cent Positive	Number of Cases	Number with Rash	Per cent with Rash
0– 4	135	104	77.0	61	53	86.9
5– 9	3,080	2,030	65.9	97	76	78.4
10–14	3,046	1,611	52.9	75	53	70.7
15–19	842	422	50.1	93	55	59.1
20–29	167	82	49.1	199	105	52.8
30–39	82	36	43.9	111	63	56.8
40–49	48	11	22.9	79	35	44.3
50 and over	51	9	17.6	72	16	22.2
Total	7,451	4,305	57.8	787	456	57.9

* Strain New York 5

† Exclusive of cases of milk-borne epidemics

FIGURE I

Per cent Positive Skin Sensitivity Tests by Age Among 7,451 Persons Tested in New York State 1934–1937, and Per cent of Cases with Rash by Age Among 787 Scarlet Fever Patients in Milk-borne Epidemics in Owego, Wellsville, and Red Creek



lowing an epidemic of septic sore throat, there was no difference between the percentage of negative skin tests among persons who had recently suffered an attack of the infection and those who had not. These observations indicate the development of an immunity to the skin manifestations produced by the toxin of the standard strain of streptococcus in individuals recovered from scarlet fever, but show no evidence of immunity, as measured by skin test, following septic sore throat.

It has frequently been observed that the proportion of persons with negative skin tests increases with increasing age in the general population. During the past 2 years a considerable number of skin tests have been performed in New York State communities where the incidence of scarlet fever was not, and had not recently been high. As seen in Table VII, the proportion of negative skin tests was distinctly higher among persons giving a history of scarlet fever but increased with age regardless of such a history. In the milk-borne epidemics of scarlet fever under consideration a decreased incidence of rash with increasing age was observed which closely paralleled the decrease in skin sensitivity as measured by the skin test in the general population (Table VIII). Figure I shows graphically the percentage of cases with a rash by age in the milk-borne epidemics of scarlet fever studied and the percentage of positive skin tests by age observed in the general population, indicating a positive correlation between sensitivity as measured by the skin test and the development of a rash.

SUMMARY AND CONCLUSIONS

An analysis was made of 1,529 cases of streptococcus infection occurring in 7 epidemics in New York State during

the period 1934–1936. That each outbreak was milk-borne was established beyond a reasonable doubt. The source of contamination of the milk supply in 6 of the 7 epidemics was shown to be a cow suffering from an acute mastitis caused by a hemolytic streptococcus of the type usually associated with human infection (Lancefield's Group A)[1] and there was at least suggestive evidence of a human source of the bovine infection in each instance.

There was evidence in epidemics both of scarlet fever and septic sore throat of transmission by personal contact comparable to that observed in contact epidemics of scarlet fever.

The appearance of a rash was the only distinguishing characteristic between cases in epidemics classified as scarlet fever or as septic sore throat. All other clinical characteristics, including frequency and type of complicating condition, were practically the same.

The effect of various factors which might be expected to influence susceptibility to infection were studied. No evidence of age or sex selection was found. Dosage of the infectious material seemed to be an important factor in determining whether or not a given individual became ill.

A previous attack of scarlet fever seemed to produce little or no immunity to an attack of milk-borne streptococcus infection but did materially lessen the probability of the development of a scarlet fever rash.

The effect of an attack of milk-borne scarlet fever or septic sore throat upon skin sensitivity to standard streptococcus toxin was tested in communities in which epidemics occurred, and a reduced skin sensitivity was observed following milk-borne scarlet fever comparable to that observed after scarlet fever transmitted by contact but no reduction of skin sensitivity was observed following septic sore throat.

Since a previous attack of scarlet fever did not prevent subsequent attacks, but did reduce the incidence of rash, and inasmuch as those persons recovered from scarlet fever showed an increased proportion of negative skin tests, it seems likely that an intradermal test with a standard streptococcus toxin measures susceptibility to the skin manifestations of scarlet fever but fails to indicate susceptibility to other and more important manifestations of the disease. This observation is further supported by the positive correlation between skin sensitivity and incidence of rash by age.

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Public Health Degrees and Certificates Granted in 1936

THE Committee on Professional Education of the American Public Health Association presents the following tables which are similar to those published in previous years covering data concerning students registered in schools of public health, and the public health degrees granted in the calendar year 1936.

College Enrollment in Public Health Courses

Number of students enrolled, and Public Health Degrees and Certificates conferred in the year 1936 in courses requiring at least 1 year of residence, by United States and Canadian Universities.

Table I

	No. of Students Registered 1935–1936				*No. of Degrees Granted 1936*		
Name of University	*Men*	*Women*	*Total*	*Degrees Offered*	*Men*	*Women*	*Total*
University of California	3	5	8	A.B.	0	0	0
				M.A.	0	0	0
				Ph.D. in Hyg.	0	0	0
				Dr.P.H.	0	0	0
DeLamar Institute of Public Health, Columbia University	10	3	13	M.S.P.H.	9	2	11
Harvard School of Public Health	32	2	34	C.P.H.[1]	4	0	4
				M.P.H.	18	2	20
				Dr.P.H.	2	0	2
Johns Hopkins School of Hygiene and Public Health	105	29	134	C.P.H.	40	1	41
				Dr.P.H.	7	0	7
				Sc.D.	3	2	5
				Sc.M.	0	4	4
Massachusetts Institute of Technology	52	5	57	C.P.H.	0	0	0
				Dr.P.H.	0	0	0
				S.B. in P.H.	8	1	9
				Ph.D.	0	0	0
McGill University	2	0	2	D.P.H.[2]	2	0	2
University of Michigan	46	23	69	M.S.P.H.	9	2	11
				Dr.P.H.	5	0	5
University of Toronto	12	0	12	D.P.H.[2]	10	0	10
				Ph.D.	0	0	0
Wayne University College of Medicine	2	1	3	Dr.P.H.	0	0	0
Yale School of Medicine	10	4	14	M.P.H.	1	0	1
				Dr.P.H.	1	0	1
				Ph.D.	0	1	1
Total	274	72	346		119	15	134

1. Harvard does not give the C.P.H. as a degree.
2. Diploma of Public Health.

CLASSIFICATION OF PUBLIC HEALTH DEGREES AND CERTIFICATES GRANTED

Number of persons receiving degrees and certificates by reason of public health courses completed:

TABLE II

Degree	*No. of Degrees Granted*	*No. of Schools Offering Degrees*
Certificate in Public Health	45	3
Master of Public Health	26	2
Doctor of Public Health	10	7
Master of Science in Public Health	22	2
Doctor of Science	5	1
Bachelor of Arts in Public Health	0	1
Master of Arts in Public Health	0	1
Master of Science	4	1
Doctor of Philosophy	1	4
Diploma in Public Health	12	2
Bachelor of Science in Public Health	9	1
Total	134	

Number of Degrees and Certificates conferred by United States and Canadian Universities for 1934, 1935, and 1936:

TABLE III

School	*Degree*	*1934*	*1935*	*1936*
University of California	A.B.	7	2	0
	M.A.	0	0	0
	Ph.D. in Hyg.	0	0	0
	Dr.P.H.	0	0	0
DeLamar Institute of Public Health, Columbia University	M.S.P.H.	7	9	11
Harvard School of Public Health	C.P.H.[1]	6	6	4
	M.P.H.	7	13	20
	Dr.P.H.	1	0	2
Johns Hopkins School of Hygiene and Public Health	C.P.H.	37	28	41
	Dr.P.H.	6	6	7
	Sc.D.	16	6	5
	Sc.M.	6	3	4
Massachusetts Institute of Technology	C.P.H.	4	3	0
	Dr.P.H.	0	0	0
	M.S.	3	1	0
	S.B. in P.H.	9	13	9
	Ph.D.	0	0	0
McGill University	D.P.H.[2]	0	0	2
University of Michigan	M.S.P.H.	12	22	11
	Dr.P.H.	3	3	5
University of Toronto	D.P.H.[2]	13	11	10
	Ph.D.	3	0	0

TABLE III (Cont.)

School	*Degree*	*1934*	*1935*	*1936*
Wayne University College of Medicine	Dr.P.H.	2	0	0
Yale School of Medicine	C.P.H.	5	2	0
	M.P.H.	0	0	1
	M.S.	0	1	0
	Dr.P.H.	4	1	1
	Ph.D.	0	1	1
Total		151	131	134

1. Harvard does not give the C.P.H. as a degree.
2. Diploma of Public Health

Number of Degrees and Certificates in Public Health granted in United States and Canada, 1934, 1935, and 1936:

TABLE IV

Degrees and Certificates	*1934*	*1935*	*1936*
C.P.H.	52	39	45
M.P.H.	7	13	21
Dr.P.H.	16	10	15
M.S.P.H.	19	31	22
Sc.D.	16	6	5
B.A.	7	2	0
Sc.M.	9	5	4
Ph.D.	3	1	1
D.P.H.	13	11	12
B.S.	9	13	9
Total	151	131	134

(Report continued on next page)

COLLEGE ENROLLMENT AND DEGREES GRANTED IN COURSES FUNDAMENTALLY ENGINEERING IN CHARACTER BUT PROVIDING TRAINING IN PUBLIC HEALTH WORK

In reply to numerous requests, the Committee on Professional Education has this year for the first time collected data on college enrollment in courses fundamentally engineering in character but which provide training in public health work. The following table gives figures for enrollment during the period 1933–1936 as well as figures on the degrees granted during the same time.

TABLE V

	College Enrollments 1933–1936				*Number of Degrees Granted 1934–1936*				
Name of University	*1933–1934*	*1934–1935*	*1935–1936*	*Total*	*Degrees Offered*	*1934*	*1935*	*1936*	*Total*
Agricultural & Mechanical College of Texas	13	5	11	29	B.S. in C.E. (San. Eng. option)	8	4	6	18
					M.S. in Municipal & San. Eng.	1	1	0	2
Cornell University [1]	17	15	12	44	M.C.E. (San. Eng. option) M.S. in Eng. (San. Eng. option) Ph.D. in Eng. (San. Eng. option)	8	7	8	23
Harvard University (Graduate School of Engineering)	17	13	26	56	S.M. in Eng. (Sanitary)	10	9	7	26
					S.D.	0	0	1	1
Iowa State College	11 Undergrad.	8 Undergrad. 2 Grad. with M.S.	7 Undergrad. 1 Grad. with M.S.	26 Undergrad. 3 Graduates	B.S. in C.E. (San. Eng. option)	11	8	7	26
					M.S. in C.E. (San. Eng. option)	0	0	0	0
					Ph.D.	0	0	0	0
Johns Hopkins University	10	5	11	26	Bachelor of Engineering	10	5	11	26
					Master of Engineering	0	0	0	0
					Doctor of Engineering	0	0	0	0
Lehigh University [2]	..	2	1	3	B.S. in San. Eng.	..	0	1	1
Massachusetts Institute of Technology	17 Undergrad. 2 Graduates	15 Undergrad. 3 Graduates	16 Undergrad. 1 Graduate	48 Undergrad. 6 Graduates	S.B. in San. Eng.	5	1	2	8
					S.B. in P.H.Eng.	0	2	4	6
					S.M. in San. Eng.	1	2	0	3
					Sc.D. in San. Eng.	0	1	0	1
New York University	15 Undergrad. 6 Graduates	10 Undergrad. 8 Graduates	20 Undergrad. 18 Graduate	45 Undergrad. 32 Graduates	B. S. in C.E. (San. Eng. option)	15	9	20	44
					M.S. in C.E. (San. Eng. option)	1	1	4	6
Stanford University [3] (Graduate School)	5	3	2	10	Engineer in C.E.: San. Eng.	2	1	1	4
University of California (Junior and Senior Years)	20	30	30	80	B.S. in Eng. (San. Eng. option) [4]	10	20	9	39
					M.S. in Eng. (San. Eng. option)	0	0	0	0
University of Illinois	8	5	6	19	B.S. in C.E.	6	2	2	10
					M.S. in C.E.	2	1	3	6
					Ph.D.	0	1	0	1
University of Kansas	6	6	6	18	B.S. in C.E. (San. Eng. option)	2	3	3	8
West Virginia University	4	6	6	16	B.S. in C.E. (San. Eng. option)	4	6	6	16
Total	151	136	174	461	Total	96	84	95	275

1. Number of students and graduating degrees relate to those especially interested in Sanitary Engineering options including both undergraduates and graduates.
2. Curriculum in San. Eng. organized in 1933–1934.
3. 2 Years after A.B.
4. Only graduates from formal course in San. Eng. included.

Summary

No. of Students Registered	1933–1934	151	No. of Degrees Granted	1933–1934	96
" " " "	1934–1935	136	" " " "	1934–1935	84
" " " "	1935–1936	174	" " " "	1935–1936	95
	Total	461		Total	275

PUBLIC HEALTH NURSING DEGREES AND CERTIFICATES GRANTED 1935–1936

The following table, reprinted with permission from *Public Health Nursing*, presents data on students registered during the school year 1935–1936 in public health nursing courses approved by the National Organization for Public Health Nursing. For this year there were 18 courses which met the requirements established by the N.O.P.H.N., but figures were available for only 16 of the courses. (No information was received from Fordham University, New York, N. Y., and the University of Hawaii, Honolulu, T.H.)

TABLE VI

Number of Students Registered in Approved Courses in Public Health Nursing and Number of Certificates and Degrees Given in Academic Year 1935–1936 and Summer Session 1936

State	Institution	Year	Total Registration	Graduate Students Registered	Undergraduate Students Registered	On Full-time Schedule	On Part-time Schedule	Certificates Given or Full Public Health Nursing Program Completed	Degrees Granted: B.S. or B.A.	Degrees Granted: M.S. or M.A.
Calif.	Univ. of California Div. of Nursing Ed. Berkeley	Year 1935-1936 Summer Session	100 78	80 78	20 ..	100 78	.. ..	31 ..	20 ..	.. ..
D. C.	Cath. Univ. of America [1] School of Nursing P.H.N. Division Washington	Year 1935-1936 Summer Session	27 20	27 20	.. ..	5 20	22 ..	5 ..	.. ..	.. ..
Mass.	Simmons College School of Nursing Boston	Year 1935-1936 Summer Session	87 42	57 42	30 ..	87 ..	.. 42	17 ..	10 ..	.. ..
Mich.	Univ. of Michigan Dept. of P.H.N. Ann Arbor	Year 1935-1936 Summer Session	91 133	91 133	.. ..	63 133	28 ..	10 ..	10 ..	2 ..
	Wayne University College of Lib. Arts Dept. of Nursing Detroit	Year 1935-1936 Summer Session	588 28	578 28	10 ..	29 4	559 24	60 ..	4 ..	.. ..
Minn.	Univ. of Minnesota Dept. of Preventive Medicine and P. H. Minneapolis	Year 1935-1936 Summer Session	448 154	427 154	21 ..	361 133	87 21	37 ..	17 ..	.. ..
Mo.	Washington Univ.[2] School of Nursing Dept. of P.H.N. St. Louis	Year 1935-1936 Summer Session [2]	57	50	7	17	40	9	4	..
N. Y.	Columbia University Teachers College Dept. of Nursing Ed. New York	Year 1935-1936 Summer Session	307 161	307 161	.. ..	[3] No distinction	[3]	[4]	15[5] ..	9[5] ..
	Univ. of Syracuse College of Medicine Dept. of P.H.N. Syracuse	Year 1935-1936 Summer Session	64 172	64 172	.. ..	22 143	42 29	10 ..	.. ..	.. ..
Ohio	Western Reserve Univ. Sch. of App. Soc. Sc. Cleveland	Year 1935-1936 Summer Session	66 35	61 35	5 ..	55 33	11 2	36 ..	.. ..	2 ..
Oreg.	Univ. of Ore. Med. Sch. Dept. of Nursing Ed. Portland	Year 1935-1936 Summer Session	25 26	25 26	.. ..	20 26	5 ..	19 ..	8 ..	.. ..
Pa.	Univ. of Pennsylvania [1] School of Education Dept. of Nursing Ed. Philadelphia	Year 1935-1936	65	65	..	4	61	..	..	..

(Continued on next page)

TABLE VI (Cont.)

Number of Students Registered in Approved Courses in Public Health Nursing and Number of Certificates and Degrees Given in Academic Year 1935–1936 and Summer Session 1936

State	Institution	Year	Total Registration	Graduate Students Registered	Undergraduate Students Registered	On Full-time Schedule	On Part-time Schedule	Certificates Given or Full Public Health Nursing Program Completed	Degrees Granted: B.S. or B.A.	Degrees Granted: M.S. or M.A.
Tenn.	George Peabody College for Teachers Dept. of Nursing Ed. Nashville	Year 1935-1936	204	204	..	196	8	25	6	3
		Summer Session	177	177	..	173	4	..	..	..
	Vanderbilt Univ. School of Nursing Nashville	Year 1935-1936	21	21	..	17	4	10	8	..
Va.	College of Wm. and Mary School of Social Work and Public Health Richmond	Year 1935-1936	20	16	4	20	..	15	4	..
Wash.	Univ. of Washington School of Nursing Ed. Seattle	Year 1935-1936	82	65	17	81	1	24	14	1
		Summer Session	75	74	1	75	..	..	..	..
		Total 1935-1936	2,252	2,138	114					
		Summer Session	1,101	1,100	1					
		TOTAL	3,353	3,238	115			308	120	17

1. Course started in September, 1935.
2. Course discontinued in June, 1936.
3. Winter session: full-time 73, part-time 176. Spring session: full-time 85, part-time 194.
4. Information not available.
5. Approximate number.

For the school year 1935–1936 the total course registration was reported as 3,353 as compared with 2,524 in 1934–1935, an increase of 829 students. The number who received certificates or who completed the full public health nursing program in the school year 1935–1936 was 308 as compared with 244 in 1934–1935, an increase of 64.

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What the Medical Student Should Be Taught About Vital Statistics*

THOMAS J. LEBLANC, Sc.D.

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IF we assume the existence and use of vital statistics to be justified by their ultimate application to the prevention of disease and the promotion of health, then we must have a clear conception of the place of the medical student in the scheme of health promotion, because the nature of this concept will in a great measure determine the pedagogical approach to teaching the subject.

It is my conviction that much of the future of preventive medicine, in its broadest sense, rests with the private practitioner of medicine as contrasted with those technically trained as professional workers in public health. The reason for this lies in the shift of emphasis that is taking place. Most of the generalized principles of sanitation which may be applied in the mass are already in effect—I mean such maneuvers as controlling water and milk wherein no coöperation is asked of the individual except that he pay the bill. The future would seem to be concerned with more individualistic aspects, such as campaigns for immunization as in diphtheria, or even treatment and cure as in syphilis, wherein the technic cannot be applied so clearly in the mass but is the result of an individual relationship between doctor and patient. It is this type of preventive work which is looming large on the horizon, bringing into prominence the general practitioner. Since most medical students are general practitioners in embryo, it is the teacher's responsibility to add to their background anything that will contribute to the effectiveness of the part they play in prevention in the future. This type of approach not only justifies but makes mandatory the inclusion of much material not essential to the training of a physician of the past.

In all probability, the future will see the medical man, by reason of his position in the pattern of community mores, having a close relationship to social evolution, in which case he will have to be able to follow intelligently, and to judge with discrimination, much work which will be expressed in the terminology of vital statistics. The foregoing are some of the points which might be advanced as reasons for saying that the time has passed when it was sufficient to offer the medical student a few scattered facts on crude death rates.

The student should know the prin-

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ciples of tabular and graphic presentation of data, not only because he may wish to present data, but also because he will inevitably encounter such data in his professional journals and should recognize the pitfalls of bad presentation and the possibilities inherent in optical illusions. A practical field which merits more attention than it is getting covers history forms, survey blanks and other record sheets, and the methods of manipulating such records including mechanical sorting and tabulating. Familiarity with this field is advisable not because the doctor will necessarily use such methods, but, what is more important, an understanding of the technic will make for coöperation on the part of medical men, whereas ignorance usually leads to lack of coöperation or even active opposition. This is the reason for giving the medical student an understanding of statistical technic which the general practitioner will never have to use.

It is not necessary or advisable that the medical student should be harassed with formulae or mathematical symbols. The average medical student is filled with fear at the sight of a mathematical formula. Apparently, to him, a Greek letter is at home only in connection with a fraternity and while he may understand that a prescription is merely a shorthand method of putting concisely an elaborate statement in pharmacology, it is expecting too much to ask him to think the same of the symbolical formulae in mathematics. To put it a little differently, he uses a microscope without being able to grind the lenses, or knowing anything about the formula of curvature of the lenses, and in the same way he should be able to use, as far as it is advantageous to him, the tool of statistical method without too much concern as to its internal construction.

With this type of approach it is possible to give the medical student a fair grasp of correlation and simple curve fitting. He will not be able to calculate a coefficient of correlation, or solve the normal equations for a curve fit, but will be able to translate the terminology of a correlation coefficient and state its implications, and will know the difference between a fitted curve and one that is not so treated.

A discussion of sampling can be offered leading up to the probable error concept, at the end of which the student knows what is a probable error and no longer confuses it with instrumental error or errors of observation. Under the heading of probable error comes the whole question of differences and their significance. A great deal of scientific work, especially in medicine, hinges on the delineation of differences; the difference between an experimental and control group or between a treated and untreated group; and it is not difficult to arrest the attention of even the most clinically minded medical student with discussions of this particular segment of the field of probability. The same applies to the attributes of a "control" and time is never wasted when it is devoted to the question of what constitutes an adequate control. In this way many students develop a caution and discrimination in scientific judgment which is one of the most important traits the student can acquire, and I know of no better way of getting it than by a proper contemplation of the theory of sampling and probability. The cultural and maturing effects of this subject are such that one need offer no apologies for time spent on it, and the gratitude of the better students for having been introduced to the field is testimony of its worth.

In connection with rates and ratios, the various forms of death rates, case fatality rates, and morbidity rates are discussed mainly with the idea of stressing in the student's mind how crude the crude death rate is and how

important it is to have a clear concept of those "exposed to risk." The age specific death rate leads smoothly into the life table, which is presented for just what it is, the most compact method of presenting the essential facts about age distribution of mortality. The student will not be able to construct a life table, but at least he will know the difference between the mean age at death and the so-called life span, a distinction that eludes most of our best physicians. Under this same treatment of death rates is presented the death certificate and with special reference to the *International List of Causes of Death*. Quizzing is designed to bring out the relative value of different rubrics from a scientific standpoint, and when correlated with necropsy work by the department of pathology it may be shown how difficult it may be to assign a principal cause of death in many cases. Such an approach gives the student a real interest in the death certificate. In our classes each student is presented with a copy of *The Physician's Pocket Reference* as published by the Bureau of the Census, but, what is most important, every final examination includes at least one question on the certification of death and these questions are such as to challenge the mettle of even the best students. This engenders a respect for certification and also results in a great deal of discussion among the students outside of class hours.

Sometimes a broad type of thinking can be encouraged under the guise of something else, for example, the frequency distribution is presented and its constants are developed. This leads naturally to a consideration of variability and this in turn can be regarded as one of the chief attributes of living matter. It does not take a particularly gifted teacher to cause the medical student to regard with suspicion much of his former thinking on the so-called "norms." If variability has been approached from enough different angles the student will suddenly be shocked at the realization that he would not expect all patients to have the same length of nose, but he does expect them to have very much the same pulse rate or white blood count. Meditation along these lines will do no harm to the student even if he is to devote his future exclusively to clinical medicine.

The time necessary to achieve the approach I have outlined is not excessive. Ten to twelve 1 hour lectures with an equivalent amount of time for quizzing is enough though this will mean hard work for both teacher and student. The teacher must have his material well organized so that there is no waste motion and the student must have enough intellectual stamina to follow a difficult lecture up to the last minute. Any additional time available can be used advantageously in developing such broad aspects of human biology as fertility, population problems, and the more refined technics of investigation, such as the Chi-square test and its application to the fourfold table. I do not consider these last essential to the rank and file of medical students but it is surprising how, especially in late years, a demand is growing among the students to have such topics included in the regular work. This seems to me to be a result of the improvement in interne services, many of which lead to a fair amount of independent investigation on the part of the interne. Indeed it would not seem excessive to predict that the teaching of vital statistics in the manner outlined will be a required part of the curriculum in the better medical schools in the near future, and this might well be hastened by the growth of biophysics, although the whole will probably be delayed by the lack of properly qualified teachers. Laboratory work would be highly desirable, but in view

of the already overcrowded medical curriculum it is very unlikely that such exercise can find a place in undergraduate work. As a postgraduate subject it may well come. I have made no mention of visits to offices of registrars or divisions of vital statistics. In our work we do not include such visits. We attempt to time the course and arrange the content so that it extends to capacity even the best students, and it has been my experience that there is little intellectual adventure available in the office of the average division of vital statistics of the present day.

For the text to be used in connection with lectures and quiz sections, there is none that equals Pearl's *Medical Biometry and Statistics*. The treatment used by Pearl is so obviously medical in tone that the medical student finds himself at home among familiar terms and problems, with examples from medical literature.

Many questions about the teaching of the subject are still unanswered and remain matters of opinion, among them the already mentioned point of laboratory work. There is the question as to what year in the medical course is best. The answer to this may vary from any one of the 4 to all of them, that is, spreading the work through all 4 years. We chose the last half of the sophomore year. The student has had most of the basic sciences by this time but has not yet been completely seduced by the bedside aspects of disease. We feel that this is the most opportune time to expose his mind to the influences briefly outlined.

There are many other questions still unanswered but time does not permit of their discussion. Lack of agreement among teachers of vital statistics as to time, course content, etc., is not a peculiar attribute of the field but is held in common with teachers of other branches of the medical curriculum. As far as I know there is little or no complete agreement on approach, course content, and teaching technic for any one medical subject.

In conclusion may I not emphasize that we must never lose sight of the fact that by long odds the greatest proportion of data in the field of public health originates in the hands of the physician. Any training he gets as a student, during his formative years, which leads to a better understanding and appreciation of such data will probably emerge some time on the credit side of the public health ledger.

An Organism Resembling Hemophilus Pertussis

With Special Reference to Color Changes Produced by Its Growth Upon Certain Media

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IT is now generally believed that recently isolated strains of *Hemophilus pertussis* belong to a single serological type.[1] It is well known, however, that under certain cultural conditions typical strains of the organism undergo definite morphological and immunological changes.[2, 3, 4, 5] Failure to consider these changes, no doubt, has led workers in certain instances to conclude that more than one type of *Hemophilus pertussis* may be recovered from the upper respiratory tract of persons suffering from the disease.

The fact that *H. pertussis* is related in certain immunological respects to *Brucella bronchisepticus* as demonstrated by Ferry and Noble[6] may have some clinical and epidemiological significance. The latter organism has been isolated from the respiratory tract of human beings[7, 8] and apparently has caused clinical symptoms in a child resembling those of whooping cough.[7] Moreover, a group of cultures resembling both *H. pertussis and Br. bronchisepticus* but not identical with either was recently described by Eldering and Kendrick.[9]

This report deals with certain observations made upon a group of 10 atypical strains isolated by the cough-plate method from cases of suspected pertussis.

SOURCE OF CULTURES

Eight of our strains upon isolation were regarded as *H. pertussis* until further studies indicated that they constituted an atypical group. One strain (We) was received from Dr. L. W. Sauer as a culture of *H. pertussis* and one (309) was furnished by Dr. Pearl Kendrick as typical of the group reported by Eldering and Kendrick. This strain seemed to be very similar, if not identical, with ours, particularly in regard to its effect upon peptone-iron-agar and upon egg-glycerin-agar media.

Two of our strains (Ru) and (Fe) were isolated from infants aged 8 and 15 months respectively who were closely observed in the hospital for several weeks during which each presented all the clinical features of moderately severe pertussis. The white blood cell counts were 17,500 and 36,000 respectively. The remaining 6 strains were isolated from typical, though in several instances mild, cases of pertussis treated in their homes. During this time there was a decided increase in the incidence of pertussis in Rochester.

Since the 8 strains were observed in a series of approximately 160 consecutive positive plates, it would seem that in this community this organism constituted about 5 per cent of the strains isolated.

MORPHOLOGY AND GROWTH

Upon the original cough-plate medium consisting of the usual potato-glycerin-sheep's blood agar preparation, the colony was identical with that of typical *H. pertussis* except that growth appeared with a definite zone of hemolysis after 24 hours' incubation at 35° C. The majority of typical strains of *H. pertussis* required 72 hours under these conditions to produce the zone of hemolysis.

In the second and subsequent generations growth was faster and more abundant and the atypical strains were adapted to plain agar more readily than were the typical strains. The atypical strains remained hemolytic longer when sub-cultured upon either Bordet-Gengou or chocolate-agar medium. One strain, isolated in October, 1935, has remained strongly hemolytic to the present.

When freshly isolated, the characteristic coccoid-bacillary form was noted with very little, if any, tendency to pleomorphism. When sub-cultured upon chocolate-agar medium, the organism rapidly became longer and pleomorphic.

One strain (Ru) when sub-cultured upon chocolate-agar medium at 4 day intervals for 8 weeks lost its hemolytic power and became weakly antigenic in rabbits resembling closely the behavior of avirulent *H. pertussis*.

Growth of the organism upon slants of Bordet medium produced a definitely darker discoloration of the medium in 48 hours than did typical strains of *H. pertussis*. By noting this difference we could usually arrive at a presumptive identification of the culture. Upon plain agar, Bradford's gonococcus medium,[10] and other types of medium, growth more closely resembled that of *Br. bronchisepticus* than that of *H. pertussis*.

Growth in Douglas broth was abundant, and after 5 to 7 days produced the characteristic ropy-mucoid type with a brownish-red discoloration of the broth. *H. pertussis* did not produce this color change in the broth but did often produce a similar type of sediment.

The organism was Gram-negative and non-motile. It stained well with toluidin blue and resembled *H. pertussis* in this respect. Capsules were not demonstrated.

BIOCHEMICAL ACTIVITIES

Indol was not produced by growth in peptone water nor in tryptophane broth. Nitrates were not reduced to nitrites. Milk was made alkaline more rapidly than by *H. pertussis*. There was no production of H_2S when grown upon lead acetate medium or when grown upon Bradford's medium in slants above which were suspended strips of filter paper impregnated with lead acetate. Upon potato, the organism grew well and produced a brownish-black color in 48 hours. A similar color resulted from the growth of 2 strains of *Br. bronchisepticus*.

Upon Levinthal's medium growth was much more rapid than *H. pertussis* and a light brown discoloration of the me-

dium occurred. This observation lead to the recognition of one of the chief characteristics of this organism. This discoloration suggested that it might be due to some change in the x-factor (or iron-containing factor) of the medium. All of the atypical strains were then cultured upon peptone-iron-agar slants and in each a definite brownish-red change occurred along the slant but very little along a stab into the butt. Typical strains grew slowly upon this medium and even when fully adapted to it, did not produce this discoloration. A typical strain of *Br. bronchisepticus* obtained from Dr. Ferry likewise failed to produce the color. We believe, therefore, that the use of peptone-iron-agar medium is a rapid method of obtaining a presumptive diagnosis of this organism.

Effort has been made to determine the nature of this change in color. When 48 hour slant growths were extracted with water, alcohol, or acetone for 24 hours, the solutions became light brown and resembled in color known solutions of iron compounds. It was not soluble in ether or chloroform. Aqueous extracts of the agar mixture upon which typical strains had grown and of uninoculated agar mixture remained colorless. The pH of the aqueous extracts determined with the LaMotte Comparator were: atypical strains, 7.4; typical strains, 7.0; agar control, 6.8.

Absorption curves were made with a Bausch and Lomb Quartz Spectroscope* on the aqueous extracts of the agar growth of 3 atypical strains, of 1 typical strain, of uninoculated agar medium, and of solutions of ferric ammonium citrate, of ferric chloride and of ferric alum. The solutions of the known iron compounds were made approximately to match in color those of the atypical strain extracts.

In each instance curves were obtained in the ultra-violet with peaks at 2,670 Ångström units. Since these curves were very similar, the discoloration of the medium by the atypical strain is due probably to some change in the iron brought about by the growth of the organism; perhaps a conversion of the metal from the organic to an inorganic form such as ferric oxide or ferric hydroxide. Such a change might be facilitated by the more alkaline reaction resulting from the growth of the atypical strain.

On slants of egg-glycerin-agar growth occurred rapidly, and after 48 hours gave a grayish-brown color resembling anchovy paste. Two strains of *Br. bronchisepticus* produced similar discoloration on this medium while 30 typical strains of *H. pertussis* produced no change.

When 48 hour growths upon chocolate-agar plates were flooded with a 1 per cent solution of hydrogen peroxide, there was an immediate vigorous "bubbling" indicating that there had been considerable production of catalase. Growth of typical *H. pertussis* strains produced very little, if any, catalase when tested in this manner, while *Br. bronchisepticus* gave a marked reaction.

ANIMAL INOCULATIONS

A standard suspension containing approximately 10 billion organisms per c.c. was employed for all animal inoculations. This was prepared by scraping a 48 hour growth from Bradford's medium into physiological salt solution, and adjusting to match a standard suspension.

Mice: Intratracheal injection of 0.05 c.c. of this standard suspension into white mice produced typical interstitial pneumonia, about 75 per cent dying in 2 to 10 days. Almost pure cultures of the organism could be cultured

* We are indebted to Dr. L. T. Steadman of the Division of Radiology for this information.

TABLE I

Agglutination Tests Comparing 9 Typical with 7 Atypical Strains of H. Pertussis

	Sera			
	Typical		*Atypical*	
Strains				
Typical	*O'C #301*	*Ba #338*	*Ru #884*	*Wa #336*
Sp	1,280	1,280	320	320
Ho	160	160	00	00
We	1,280	2,560	320	160
Mo	2,560	1,280	80	160
Ot	1,280	160	160	10
Ba	2,560	5,120	160	40
La	2,560	2,560	320	320
We	2,560	160	160	10
O'C	5,120	5,120	20	80
Atypical				
We	160	20	2,560	2,560
La	40	40	2,560	2,560
Fe	20	160	2,560	2,560
Mi	160	80	2,560	2,560
Wa	80	40	5,120	5,120
Ru	80	40	5,120	5,120
Ke	40	160	10,240	2,560

from the lungs of animals sacrificed 14 to 22 days after inoculation. In some instances a marked leucocytosis resulted as demonstrated by blood counts during life. A similar lung lesion produced by intranasal inoculation of mice with *H. pertussis* has been described by Burnet.[11] Intraperitoneal inoculation of mice with dosages ranging from 0.2 c.c. to 0.5 c.c. of the standard suspension resulted in invasion of the blood stream and death within 48 hours. Hemorrhagic lesions of the peritoneum, kidneys, liver, and lungs were found similar to those observed after inoculation with strains of typical *H. pertussis.*

Rabbits and guinea pigs: Intradermal inoculations of 0.1 c.c. of a 1 to 10 dilution of the standard suspension produced hemorrhagic necrotic lesions within 72 hours identical with those produced by the injection of typical *H. pertussis.*

IMMUNOLOGICAL STUDIES

Each of the strains has proved strongly antigenic for rabbits. Animals averaging 2 to 2.5 kg. were immunized by intravenous injections. Suspensions of the organism were made in physiological salt solution from 48 hour growths of Bradford's medium, standardized to contain approximately 10 billion organisms per c.c. and killed by the addition of merthiolate in a 1 to 10,000 concentration. The rabbits were immunized according to the method of Kendrick,[12] receiving intravenously 0.2 c.c., 0.4 c.c., and 0.8 c.c. of the suspension per kg. of body weight at 4 day intervals. Trial bleedings were done 10 days after the last injection, and when the agglutination titer was sufficiently high, the serum was collected and stored at 4° C. Agglutination tests were done by the rapid method of Kendrick[13]; absorption tests by inoculating 1 to 10 dilutions of the serum with heavy suspensions of the absorbing strain. After thorough mixing, the serum-antigen mixture was stored at 4° C. for 24 hours, after which the serum was cleared by centrifugalization.

TABLE II

Agglutinin Absorption Reactions Comparing 2 Typical with 2 Atypical Strains of H. Pertussis

Serum	Absorbing Strain	Before or After Absorption	Typical Strains		Atypical Strains	
			O'C	Ba	Ru	Wa
O'C #301 (Typical)	....	Before	5,120	5,120	80	80
	O'C	After	40	00	00	00
	Ru	After	1,280	2,560	00	00
Ba #338 (Typical)	....	Before	5,120	5,120	40	40
	Ba	After	160	80	20	40
	Wa	After	160	80	00	00
Ru #888 (Atypical)	....	Before	20	20	2,560	2,560
	Ru	After	00	00	00	00
	O'C	After	00	00	2,560	2,560
Wa #336 (Atypical)	....	Before	10	00	2,560	2,560
	Wa	After	10	00	00	00
	Ba	After	10	10	1,280	320

DISCUSSION

The agglutinin titers recorded in Table I clearly show that there was a distinct difference between the typical and atypical strains, although sufficient cross-reactions existed to indicate some immunological relationship between the two. This is further indicated in Table II where it is noted that the agglutinins of a typical antiserum, Ba, for typical strains were significantly removed by absorption with the atypical strain, Wa, and also that the agglutinins of an atypical antiserum, Wa, were definitely reduced by absorption with the typical strain, Ba.

No agglutination resulted when 2 typical antisera (O'C and Ba) and 2 atypical antisera (Ru and Wa) were set up with a stock strain of *Br. bronchisepticus* obtained from Dr. Ferry.

It is evident from a study of the cultural, biochemical, and immunological reactions of this group of strains that they constitute a very definite group of pertussis-like organisms, probably more closely related to *H. pertussis* than to *Br. bronchisepticus*. The most conspicuous characteristic of the group was the definite discoloration produced by growth on either peptone-iron-agar or egg-glycerin medium, which affords a method for rapid identification. There seems to be sufficient immunological difference between them and typical strains of *H. pertussis* to suggest that they should be recognized in the preparation of pertussis vaccine.

SUMMARY

During the routine examination of cough-plate cultures for the diagnosis of pertussis, a group of atypical strains of organisms resembling *H. pertussis* has been observed. Eight (5 per cent) closely related strains have been collected in 160 consecutive positive cultures.

Although these atypical strains are morphologically, biochemically, and immunologically related to typical strains of *H. pertussis*, there are the following important differences: (a) The atypical strains grow more readily and remain hemolytic for a longer time. (b) They produce a very characteristic brownish-red discoloration when grown upon peptone-iron-agar and a brownish-gray color upon egg-glycerin agar. (c) They are strong catalase producers.

Each of the 8 strains was strongly antigenic when injected into rabbits. It

is suggested that a representative strain of this group be included in pertussis vaccine for immunization purposes.

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ANNOUNCEMENT

THE SIXTY-SEVENTH ANNUAL MEETING

of the

AMERICAN PUBLIC HEALTH ASSOCIATION

will be held

Tuesday, October 25, to Friday, October 28, 1938

Kansas City, Missouri

A Rapid Method for Demonstrating Negri Bodies in Tissue Sections

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SINCE Negri [1, 2] first described the bodies which bear his name and which are pathognomonic of rabies, workers have sought to develop improved methods for demonstrating Negri bodies in tissue sections. Rapid methods [3–6] are available for films of fresh brain tissue. Occasionally, Negri bodies can be demonstrated, especially in human material, only after a careful study of paraffin sections. Moreover, the cellular relationships are well preserved so that the search for Negri bodies, which are invariably intracellular inclusions, is greatly facilitated and the smaller bodies can be more readily detected. Since paraffin sections are more permanent than films, material is available for histological studies.

The methods most commonly employed in this country for staining Negri bodies in sections [7–10] have the disadvantage of requiring in most instances 48 hours or more. An attempt was therefore made to devise an efficient procedure which would be less time consuming. The Wilhite stain,[11] modified for use with paraffin sections by increasing the rosanilin from 1.5 to 1.8 gm. and the methylene blue from 0.9 to 1.0 gm. and decreasing the glycerol and methyl alcohol from 125 to 100 c.c., was found to be the most satisfactory. By shortening fixation in Zenker's fluid to 6 hours and using the modified Wilhite stain, less than 30 hours is required.[12]

A greater saving of time has resulted from the use of dioxan as a dehydrating and clearing agent.[13–15] Comparative studies were made of these newer technics and a method has been developed by which paraffin sections are prepared within 3 hours after fixation, and excellent sections of tissue from rabid animals are available within approximately 8 hours of the receipt of the specimens. Nelson [16] has recently published a rapid method for preparing paraffin sections by the use of dioxan which is similar to this except for the use of acetone, which has not been found necessary in the procedure here described.

Dioxan (diethylene oxide) is a clear, colorless fluid readily miscible with water, alcohol, and molten paraffin. It permits rapid dehydration and clearing of tissue with very little distortion. Less shrinkage occurs than with the usual paraffin technic. Since it is volatile and acts as a cumulative poison, caution must be exercised and the container must be carefully stoppered. Prolonged exposure to its vapor even in a 1:1,000 concentration produces severe toxic effects.[17] Dioxan can be purchased through most commercial houses and is relatively inexpensive as it can be used several times.

TECHNIC

Fix blocks not more than 3 mm. in thickness of fresh tissue from the hippocampus major and the cerebellum in Zenker's solution for 4 hours at 37° C. Wash 30 minutes in running tap water. The tissue may be left in running water over night. For dehydration, use preferably a bottle with a tightly fitting ground glass stopper to prevent vapor from escaping, on the bottom of which anhydrous calcium chloride is put to a depth of about 1 cm. Add about 80 c.c. of dioxan containing a few flakes of iodine to assist in removing the mercury precipitate from the tissues. Place the blocks in the dioxan, supported well above the layer of calcium chloride. (A noncorrosive wire tripod with a fine mesh screen has been used.) Stopper the bottle tightly and keep the material at 37° C. for 1 hour.

Transfer the blocks to a mixture of equal parts of dioxan and paraffin and hold for 1 hour at 56° C. Care should be taken to have the blocks rest a few centimeters above the bottom of the bottle, since dioxan tends to settle.

Place the blocks in a paraffin bath at 56° C. for 1 hour; then embed in paraffin. Cut sections 4 μ in thickness and attach to slides with Mayer's albumin fixative. Heat slides carefully, section up, over a low Bunsen flame until the paraffin begins to melt. By that time, the water will have evaporated and the slides can be put in xylol. Remove paraffin in the usual manner and place slides in distilled water before staining sections.

STAINING METHOD

I. Stock solution.

Rosanilin (Gruebler)	1.80 gm.
Methylene blue (Nat. col.)	1.00 gm.
Glycerol (T. P.)	100.00 c.c.
Methyl alcohol (T. P.)	100.00 c.c.

Shake for several minutes. The mixture keeps indefinitely.

II. Solution.

1:40,000 aqueous solution of potassium hydroxide

For staining, add 1 drop of solution I to 2 c.c. of solution II. This mixture should be freshly prepared for each use.

Remove slides from the water; place on an electric plate; flood with freshly prepared stain and gently steam 5 minutes. Cool and wash quickly in tap water.

Decolorize and differentiate each section separately by gently swishing the slide in a jar of 90 per cent ethyl alcohol until the section assumes a faint violet color. This is a particularly important step.

Pass the sections rapidly through 95 per cent alcohol, absolute alcohol, and xylol. Mount in Canada balsam.

Negri bodies stain a deep magenta red and, under high magnification, the granular inclusions are dark blue. Nucleoli appear bluish black; cytoplasm, bluish violet; and red blood cells, a copper color.

DISCUSSION

Brains of dogs known to be or suspected of being rabid and those of normal animals were used in this study. Negri bodies were demonstrated in brain tissue fixed as late as 48 hours after death when the heads had been kept on ice. The Negri bodies, regardless of size, were readily differentiated by their deep magenta red color. Atypically staining inclusion bodies occasionally found in films of fresh tissue were not seen in specimens prepared by this method.

SUMMARY

A rapid and improved method for demonstrating Negri bodies in sections is described. The essential features are the short period of fixation in Zenker's fluid, the rapid preparation of paraffin sections by the use of dioxan, and the

employment of a modified Wilhite stain. The entire procedure, from the removal of the brain to completion of the sections, requires approximately 8 hours. The Negri bodies assume a deep magenta red color, which contrasts sharply with the staining of all other structures and permits easy identification.

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Nervous and Mental Diseases

IN the United States today, 450,000 people are social liabilities because of mental disease; 500,000 more are in prisons and reformatories; 1,000,000 more fail of being social assets because of a low level of intelligence. . . .

There is no escape from the issue. Man can redeem his fellow. Human society is as ruthless as the law of the jungle, but it can be as relentless in sweeping away obstructions to its own progress as in overcoming hindrances to its pleasures. Fear of ignorance is the only fear worthy of survival in our time. If we can abolish the other fears, which paralyze action, freedom, self-expression, and freeze out the happiness of childhood, we shall have done a service incomparably more memorable than the triumphs of bacteriology in the past half century.—*Haven Emerson, M.D.*, address before the First International Conference on Mental Hygiene.

EDITORIAL SECTION

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WE NEED A NEW AND STRONG FOOD AND DRUGS ACT

THE tragic deaths of some 67 persons scattered through 11 states of the Union through the taking of the so-called Elixir of Sulfanilamide-Massengill has called attention in a dramatic way to the need of better protection of the public against dangerous and untested drugs and preparations put out by manufacturing concerns. From time to time as attempts have been made to improve our Food and Drugs Act, this *Journal* has discussed our needs. In an editorial in February, 1936, page 183, there were given what were considered the chief points which needed amendment and showed the weaknesses of the Copeland Bill, S-5, then under consideration.

We are still operating under the Food and Drugs Act of 1906, as amended. All through it has been a fight by importers, manufacturers, and venders of food and drugs against consumers, with the consumers largely on the losing end. The defects of the Food and Drugs Act under which we are operating are summarized as follows:

"It does not provide adequate obligatory standards of purity, potency, wholesomeness, and labeling of foods and drugs. It provides no standards whatever for the soundness, safety, accuracy, potency, and labeling of the many devices that are now used for the diagnosis, mitigation, and cure of defect, deformity, injury, and disease. It provides no standard for the purity, safety and labeling of cosmetics. . . . It provides no adequate means of arresting the distribution of food at its source when there is reason to believe that it was contaminated there by dangerous bacteria. Finally, the Food and Drugs Act of 1906, as amended, is impotent against false or fraudulent advertising of foods, cosmetics, through newspapers, billboards, the radio, and any of the other channels open to advertisers." The Act allows the use of trade names through which even the standards for foods can be evaded.

The Tugwell Bill introduced into the 73rd Congress provided for a practical dictatorship and apparently failed largely on account of this feature. In the 75th Congress, 9 bills relating to food, drugs, etc., were introduced. One bill,

S-5, was introduced into the Senate by Senator Copeland, and passed March 9, 1937, since which time it has been before the House of Representatives. There is an apparent conflict of authority for enforcement, but even if passed, it is the opinion of those qualified to judge that it falls very short of giving the protection which the medical profession and the public has a right to demand.

A masterly summary of Federal Legislation on Food and Drugs has been prepared by the Bureau of Legal Medicine and Legislation of the American Medical Association.[1] It is difficult to summarize it, but it discusses fully the points brought out in the editorial in this *Journal* and mentioned in the present article. We commend it to the careful reading of all physicians and health workers, but wish also that the general public could be induced to study such questions.

The same issue of the *J.A.M.A.* contains accounts of experimental work showing that the lethal agent is not sulfanilamide, but diethylene glycol. We believe the collection of material concerning this wholesale poisoning, including its distribution, postmortem appearances, and experimental work showing the lethal effects of diethylene glycol, and of Elixir of Sulfanilamide-Massengill on animals, constitutes an outstanding service on the part of this *Journal* to the medical profession.

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JOSEPHINE ROCHE

PUBLIC health workers the country over are acutely aware of the great loss to the public service and especially public health service resulting from the resignation of Miss Josephine Roche as Assistant Secretary of the Treasury. Her broad knowledge of social problems; her knowledge of the interdependence of vital and natural resources; her appreciation of the opportunities for public health work to serve the cause of public welfare; all combined to give her the vision to see and the courage to bring about a recognition of the Federal Government's responsibility in the conservation of health that is now written into national policy by certain provisions of the Social Security Act. Policy is not action, however, and Miss Roche's service in administration and coördination of the expansion of service has been even more important than establishment of the policy for thus has thought been translated into action. Of her third progress report as Chairman of the Interdepartmental Committee for the Coördination of Health and Welfare Activities, the President said: "It marks extraordinary progress in bettering our health and welfare activities through a unified program which is causing the work of each department and agency to supplement that of others instead of conflicting with them. I know that the fine work this committee has done is largely due to the enthusiasm and hard work you have put into it as Chairman."

Truth is that the sense of values, experience, and practical idealism which made up Miss Roche's almost unique qualifications for the tasks she so well accomplished are all too rare, for she had successfully applied in private life the principles which she so ably advocated as a public servant. Those of us who had the rare privilege of close association with her in everyday work found her uncompromising devotion to the public interest a constant inspiration and an unfailing support. Perhaps this feeling was best expressed in the statement of Surgeon General Parran that "With the retirement of Assistant Secretary Roche,

the government loses its ablest and most sincere advocate of public health. As the first woman Assistant Secretary of the Treasury, and as the first person occupying that position primarily because of her knowledge of public health and social problems, Miss Roche has rendered a splendid and unique service. It has been a pleasure to work under her direction. I am delighted to know that she will continue to give some of her time to further coördination of the health and welfare activities of the government. I hope the loss of her services as Assistant Secretary will be only temporary."

It is encouraging that Miss Roche is to continue her connection with the Interdepartmental Committee. It is to be hoped that she can soon return to public service for the country can ill afford the loss of a public servant of such distinguished ability.

THE NATIONAL CANCER INSTITUTE

ON August 5, 1937, the National Cancer Institute Act was signed. This Institute will be a part of the U. S. Public Health Service, and the Act authorizing its creation calls for $750,000 for the erection and equipment of suitable facilities and a yearly appropriation of $700,000 to maintain the Institute. Its primary object will be research in all phases of cancer diagnosis, prevention and study of treatment, which will include radiology, specific cancer surgery, X-ray, pathology, biochemistry, bio-physics, and their relation to the disease. Any knowledge gained will be made available to doctors, societies, and health agencies all over the world who are engaged in cancer work. The appropriation also makes it possible for funds to be allocated as grants-in-aid for research projects, whether conducted by an individual or cancer research society, which show promise of making valuable contributions to human knowledge of aspects of the disease. The Council will decide which applications for such grants-in-aid have merit and should be so furthered, and which are useless and should not receive assistance.

Under the terms of the Act, radium may be purchased by the Institute, for use either in research or the treatment of cancer, and this radium may be lent to institutions in the United States established for the study of the cause, prevention, or diagnosis of treatment of cancer, or for its actual treatment. But that is not all. The Institute will coöperate in any manner necessary or feasible and permitted by law with already established organizations or individuals engaged in the fight on cancer. This can include public or welfare organizations, state, county, or municipal health departments, etc.

The plans for this Institute are practically ideal. They also include the power to establish and maintain research fellowships with such allowances as the Surgeon General may deem necessary to procure the most promising and brilliant research fellows from here or abroad. The Institute will also specifically provide the necessary facilities for the training and instruction in all technical matters pertaining to cancer diagnosis and treatment for people who, in the opinion of the Surgeon General, already have proper training and background to make them eligible.

The Institute is to be erected at Bethesda, Md., a mile beyond the northwest boundary of the District of Columbia, on land donated to the Public Health Service by Mrs. Luke Wilson and her son. The building in all probability will be begun in the spring of 1938.

The most recent step forward in this great undertaking is the appointment of a National Advisory Cancer Council, which was announced on September 29, 1937, by Surgeon General Thomas Parran. It contains an imposing list of names, with himself serving ex officio as Chairman: Dr. James Ewing, Dr. Francis Carter Wood, C. C. Little, Sc.D., Arthur H. Compton, Ph.D., James B. Conant, LL.D., and Dr. Ludwig Hektoen, men to whom the medical profession needs no introduction, and no recital of their achievements in their specialized fields of cancer and scientific research. An outstanding cancer clinician, the Editor of the *American Journal of Cancer*, the Managing Director of the American Society for the Control of Cancer, a Nobel Prize winner, the President of Harvard University, well known as an organic chemist, and an eminent professor of pathology—these qualifications only touch on the long list which these men bring to the Council table.

With 140,000 deaths a year in the United States from cancer, if this Institute can serve as the instrument eventually to lower this figure 20 per cent, it would be a very great thing. In the meanwhile, the careful planning, liberal consideration of the various phases of cancer research, and splendid nucleus of personnel, certainly stamp this new armory for cancer warfare as being a wise investment of the United States Government.

THE HEALTH OFFICER AND THE ACCIDENT PROBLEM

PUBLIC health is becoming increasingly interested and active in the accident problem. In an article which appeared in this publication last February, Dr. Edward S. Godfrey [1] urged that all health departments take an active part in preventing death from accidents. The Conference of State and Provincial Health Authorities has recently appointed a Committee on Uniform Traffic Accident Statistics. At the New York meeting of the American Public Health Association, a resolution was adopted at the instance of the Vital Statistics Section, urging that the President of the United States ". . . bring to the attention of the Congress the necessity for more intensive study of the accident problem and ask the Congress to make an adequate appropriation of federal funds, for a minimum period of two years, to be expended under the direction of the appropriate federal agencies, for a comprehensive nation-wide statistical survey of this problem."

Some persons might question why health officers and health organizations should interest themselves in the accident problem. A prime reason for participation is that some phases of the accident prevention campaign, notably the home accident problem, can best be carried out through the agency of the health department. A second reason, as Godfrey points out, is that there is no great social satisfaction or profit in saving lives from the hazards of childbirth, diphtheria, or typhoid fever, only to have those same lives snuffed out through preventable accidents. It is the privilege—nay the duty—of the health officer to encourage and promote any movement looking toward extension of life.

The number of fatal accidents in the United States has, during the last few years, approximated 100,000 per year.[2] These are divided about as follows: 12 per cent in industry, 25 per cent in the home, and 63 per cent in public places, principally through the agency of moving vehicles. Progress in the reduction of these mortalities has varied greatly. The campaign against industrial accidents has been highly efficacious; mortality from this cause has declined about 44 per cent in the last 23 years. The death rate for fatal accidents in the home has shown practically no decline during this time. The death rate for motor

vehicle accidents has increased enormously. The mortality per 100,000 population from this cause has increased 568 per cent during 23 years: from 4.4 in 1913, to 29.4 in 1936, when approximately 37,800 persons were killed in the United States.[3] The indications that the number of deaths per unit of auto traffic may have declined in the last 15 years,[4, 5] are interesting, but they do not erase the fact that there is a frightful and unnecessary wastage of life from motor vehicle accidents, that this wastage is still on the increase, and that something beyond present efforts must be done to reduce this carnage.

What can the health officer do about the accident problem?

One of the needs in the situation is a detailed and well balanced program for health department participation. A number of opportunities are, however, obvious. The first of these concerns the field of home accidents. Here, physicians, public health nurses, and other health visitors can serve in an educational way. Other approaches can be made through schools, newspapers, and the radio. Although data about accidents are still incomplete, valuable information can be obtained from such sources as the National Safety Council in Chicago, the American Red Cross, insurance companies such as the Metropolitan and the Travelers, the Division of Vital Statistics of the Bureau of the Census, and the recent publication by Dublin and Lotka.[6] Among health department publications, those of Dr. Earle G. Brown for Kansas are especially to be consulted.

In the prevention of motor vehicle accidents, the primary responsibility probably must fall upon the police, motor vehicle, and highway authorities. The health officer, however, can still serve by coöperating or, if necessary, irritating. In particular, if there is no joint council of agencies for prevention of accidents in his community, the health officer will do well to stimulate organization of such a body by the governor, mayor, or city manager.

The health department can further promote the cause of accident prevention by improving collection of data on accidents. Correct entries on the death certificate, particularly place of accident, should be insisted upon. Follow-up studies of accidents by an intelligent agent equipped with a carefully worded schedule, are likewise needed. The Bureau of the Census has recently issued such schedules in provisional form.

Once let the health department become accident conscious, and other modes of attacking this problem will readily present themselves. The health officer who coöperates will find his efforts appreciated in gratifying fashion. The public is becoming aroused. Statistical bureaus report that more inquiries are received for accident statistics than for all other vital statistics combined. A real opportunity lies before the health officer. He should take action promptly and vigorously.

Finally, the program committees for the next annual meeting of this Association will do well to arrange for thorough discussion of the nature of the accident problem and of the program for solving it.

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PUBLIC HEALTH EDUCATION*

"Panic, Publicity and Polio"—Under this title, *Journal of A.M.A.* (Sept. 18, 1937) discusses past and present panics over disease. Suggestive comparisons are made with more widespread "crippling" diseases which do not arouse panic.

As to the present:

Before the people of the country at this time, preventive medicine presents a lamentable aspect. Many health officers, following the lead of Chicago, are delaying the opening of schools. It is not clear whether this creates or allays panic. Some health officers are publishing day by day lists of cases actually diagnosed—with large lists of those suspected of having poliomyelitis. This enhances the panic. In other communities health officers have announced that they will not delay opening the schools or close the schools, since this seems to be contrary to fairly well established public health practice. In 1932 the health officers of Boston, San Francisco, Philadelphia, Los Angeles, Cincinnati, and Chicago declared themselves opposed to delaying the opening of schools and to closing of schools to prevent epidemics of infantile paralysis. Similar views were expressed by Sir George Newman, Minister of Health in Great Britain, and by the Medical Director in the Department of Social Affairs of Oslo, Norway. Certainly there has been no new information or evidence since 1932 to warrant a change of opinion. There has only been new emphasis on poliomyelitis and perhaps too much publicity. Without the overemphasis in the press the vast majority of people would not have been concerned by the few hundreds of cases among many millions of people.

From Canada we get a point of view expressed editorially in *Health,* Health League of Canada, 105 Bond St., Toronto, Ont. (Sept., 1937):

There are lessons to be learned from the public interest in an epidemic of this type which go far beyond the control of this particular disease. There is a peculiar quirk in human psychology which seems to demand the dramatic. An epidemic of poliomyelitis seems to be in the same class as the sinking of a Titanic because to some degree the circumstances are similar. Yet the sudden dramatic death in an epidemic is not the only death. Unheralded and unsung, death has her daily victories without benefit of publicity. As a result of our failure to realize that most illness is preventable and most deaths are postponable, if not preventable, we fail to set preventive machinery in motion. It takes an epidemic to stimulate us to even consider the simplest of hygienic precautions. We drink unpasteurized milk and eat without washing our hands simply because we have not been frightened into doing anything else. . . .

People are disturbed about infantile paralysis and anxious to do something about it because the necessary educational work has been done—largely by the press. But they continue to disregard preventable though more serious maladies because the necessary educational work has not been done.

One sometimes hears criticism of publicity with reference to epidemics because it may create panic. There has been no evidence of panic in connection with the present epidemic; only a lively but healthy understanding of a serious situation, followed sooner or later by sensible moves in the direction of prevention. This is as it should be. Perhaps if it were possible to create a similar psychological reaction with reference to other death dealing maladies action would be as prompt. Naturally it would be more effective because there are many causes of death and disability both in the young and the old which are better understood than that which at the moment has succeeded better than the others in capturing the public imagination.

138,660 in One Month—September 1, 1937, the *Canadian Press* sent out the following:

Daily showings of the Dionne quintuplets will be cut from 2 hours to 1 hour, starting Sunday, September 12, it was stated today. They will be seen in their nursery playground from 9:30 A.M. to 10 A.M. and

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

from 2:30 P.M. to 3 P.M. Despite a falling off in attendance in the last week of August, about 19,000 more persons saw the children in that month than in July, figures released by Dr. A. R. Dafoe today showed. During August 138,660 persons in all saw the quintuplets.

Dr. Dafoe has written confirming those figures. Simple curiosity brought most of those visitors. We wonder what proportion of them have heard something about the precautions taken for the health of the children. Has the visit to the quintuplets deepened the educational impression?

We wish that some organization or individual would undertake to provide printed matter, telling of the health care of the girls, which might be given to all of the visitors. Could the national health services of the two countries provide this material?

Usually Capital Letters Are Bigger Not Better—Capital letters have been carefully and scientifically studied by psychologists who specialize in the advertising field. These investigators have found that capital letters actually slow down the reading, or at least the understanding, of what is read in print or in displays.

The one advantage that capital letters have is that they are usually made larger than the corresponding lower case letters. This of course is not an argument in favor of capital letters.

Every additional capital letter adds illegibility, and takes away something from the sense of readability.

Every Additional Capital Letter Adds Illegibility, and TAKES AWAY SOMETHING FROM THE SENSE OF THE READABILITY OF WHAT IS PRINTED OR DISPLAYED. Note how much easier it is to read *this* sentence, and how much more interesting it looks as you glance over this paragraph in contrast with the preceding sentence.

The Past Chairman Speaks—The new ex-Chairman of the Public Health Education Section, Homer N. Calver, was requested to supply several last paragraphs addressed to our readers. Here is his reply:

The only message I have is to thank all of the Section officers, Council members, committee chairmen and members, and members of the Section, their friends, guests, delegates, the speakers, and all others who contributed to the success of our recent meeting. There was an unbelievable amount of time and effort spent on the many features of this meeting and it was this capable, voluntary service on the part of a large number of people that made possible such an interesting and valuable occasion.

The 1937 Health Education Institute—Extracts from a report by Chairman Ira V. Hiscock:

Sessions were held Sunday, Monday, and Tuesday.

Nearly all of the 186 registrants were counted as present in each of the 5 periods, with the exception of Sunday afternoon when the attendance dropped to about 145.

"In addition to the 10 leaders of the various courses and the director, there were 21 assistants or consultants, 8 additional members of the courses who gave summaries (5 minute high points) during the final general session, an educator who discussed psychological principles in the opening session, and a health officer who gave the final address on the rounded program of community health education. There was active discussion from the floor in most of the sessions. . . .

"This committee believes that the desirability of a Health Education Institute in any year should be carefully considered. The frequency, time, and nature of program of an Institute are factors which require much study. The possible effect of the Institute on the regular section program should also be weighed."

Health Workers Have Hobbies—An innovation at the New York meeting of the A.P.H.A. in October was a hobby display. It was limited and was tucked away in the farthest corner of the ballroom mezzanine so that many failed to see it. There were street car

transfers of former days, some historical documents, wooden replicas of several first vehicles in health work, and gourds.

In the social hour of the Public Health Education Section a group of hobbies were described by their riders.

Following the convention, Charles Lorenz, Springfield Gardens, N. Y., sent in a transfer dated April 26, 1908, with a "consumption in early stages can be cured" message on the reverse side from the Committee on Prevention of Tuberculosis of the New York Charity Organization Society.

We hope that the hobby show may become an accepted feature of the Annual Meeting. And why not in state and local groups?

Make Your Exhibit Say "Stop! Look!"—Under this title Rose-Marie Kronmiller in *Farmer's Wife Magazine*, St. Paul, Minn. (Aug., 1937), tells how to do just that.

If you carefully analyze exhibits you will discover what principles underlie all good ones. Passersby do not stop to consider why an exhibit is appealing; they just like it or don't like it. But a study of the planning which should come before every exhibit will reveal why the exhibit "takes."

Why do exhibits appeal? Human nature is always the same—we like color, order, simplicity, humor, and beauty, and we want our education sugar coated!

Whoever is chosen to head up an exhibit should have originality, be resourceful, and be able to imagine how the completed display will look.

If you have been assigned to work out an exhibit, get all the facts about your space. Jot down its measurements and any peculiarities, as pipes, beams, or fixtures.

Decide upon a theme or main idea for your display and stick to it. Always remember that one good important topic is far better than a maze (or mess) of many ideas.

Make a center of interest in your booth, located about the middle of the space and near eye level. The lines of all printing, all decorations, and figures should tend to go toward this center of interest. You can focus attention by gay color; unusual features, such as cartoons; attention-getting facts; radiating lines; motion, as a circular placard which moves slowly on a pivot; sound, as a victrola record or talk by a booth attendant.

Keep everything simple. You are striving for effect, not perfection of detail. Select plain, neutral, fairly light colors for the backgrounds. Use lines which are rhythmic, and restful; lettering, figures, and objects which are in harmonious proportion. Achieve a feeling of balance, whether the exhibit is seen close or at a distance. Thorough cleanliness should radiate from the exhibit, especially if a foods theme is emphasized.

Something New in Exhibits—We have not seen the exhibit here described but it sounds like a grand idea. It does seem that 12 minutes is a long time to hold a standing audience, but this exhibit may have the pull to hold people that long.

The description appears in *Health News*, State Dept. of Health, Albany, N. Y. (Aug. 30, 1937):

Six major public health problems—the control of cancer, tuberculosis, syphilis, and pneumonia, the care of crippled children, and the reduction of neonatal deaths—are presented in a series of 6 panels in crescent shaped arrangement, 3 on either side of a motion picture screen. A "telephone operator" seated before a "switchboard" and speaking into a "transmitter" announces the problem to be discussed. When she "plugs in," a sound motion picture illustrating the subject is started. At the close of the minute and a half that the picture runs, the operator throws a switch which illuminates and animates the corresponding panel. Each of these 6 panels is shown successively. The demonstration of the entire series takes about 12 minutes and is repeated after a brief pause. The work of filming and adding sound to the motion pictures was done by the Division of Public Health Education.

At Connecticut County Fairs—From *Weekly Health Bulletin*, Conn. Dept. of Health (Sept. 7):

For many years the khaki-topped tent of the State Department of Health has taken a prominent part in midway activities at agricultural fairs in Connecticut. The time

is approaching when it will have to be shaken free of its winter folds once again and put into active service in the fair circuit. The two state flags will be unfurled to Connecticut breezes at the top of the tent poles. These state flags proclaim to the midway throngs that in their midst is something a little different in midway attractions, something which belongs to them and has been placed there for their benefit.

Ordinarily such an exhibit would not fit in well with the gala spirit of the occasion, but parents have learned from previous experience that the health information they can secure in the State Department of Health tent is valuable. They like to see whether their children have made normal gains in weight during the summer months, and to discuss with those in attendance the matter of food for young children and, what is more important than anything else, how to get them to eat it.

Free health movies will be shown at each of the fairs and the health message thus graphically portrayed will be fixed more firmly in their minds. To make this message lasting, there are health leaflets to be taken home and read at leisure. These will give added assurance in health measures to be adopted.

The health exhibits this year will include one on undulant fever, a disease unknown in Connecticut until a few years ago but one that has been increasing rapidly. This exhibit will point out the fact that undulant fever in man, caused by the same germ as that causing Bang's disease or contagious abortion in cattle, is the result of drinking raw milk from infected herds. It will show the epidemiological methods used in tracing the source of the infection, and the advisability of having milk pasteurized and the herd tested for Bang's disease.

During the last 14 years the State Department of Health has sent health exhibits to 120 fairs in the state, or an average of about 9 fairs each year, 175,000 people having been reached.

Panel Discussions—The panel or platform discussion group is an effective method for talking over a difficult topic, that is, if the panel technic is not mutilated. All too frequently a "panel" means a group of speakers who make a series of short talks.

"Progressive education" groups have led in the introduction of the panel method into many schools. We give extracts from "Panel Discussions for Junior Red Cross Councils" in *Junior Red Cross Journal,* Washington, D. C. (Oct., 1937):

The Purpose of Panels: A panel is an organized conversation among the members, often with some participation on the part of the audience, with the object of bringing out all sides of a problem and arriving at a constructive course of action and thinking. The object is not, as in formal debate, to prove the superiority in argument of one team or individual over another.

Members of the Panel: A chairman; 3 or 4 members who present special phases of the subject; several other members who, because of experience or study, are qualified to enter into the conversation by questions and answers.

Responsibility of the Chairman: The chairman should see that the members are seated advantageously. Chairs are usually grouped either in a semicircle or about three sides of a table facing the audience. The chairman opens the discussion by introducing each speaker, telling who he is and what his special qualifications are. As he calls on them, he may again incidentally repeat not only names but something about their qualifications. The chairman keeps the discussion moving, encouraging the more reticent, draws out audience participation, and acts as referee if necessary.

Responsibility of Members: Those members who have been assigned special phases of the topic must be prepared through experience, investigation, and reading to present their special part of the subject in a 3 to 5 minute presentation when called on by the chairman to do so. Such preparation makes possible a helpful asking and answering of questions, also, as the discussion unfolds. The members who do not have special assignments are chosen for a general familiarity with the topic, and their ability to follow the discussion and help to keep it moving forward. All members need the ability to follow the argument, see the point quickly, and avoid dragging in irrelevant matter.

A Panel on Relief: The article on relief in this issue of the Journal may be used as the basis for a panel discussion. Someone who has informed himself about the extent of the local relief problem by interviews and reading, can present the essential facts. Other members may include representatives of the following points of view:

1. Administration of public relief

2. Private welfare workers
3. Local taxpayers
4. Employment agencies interested in getting those on relief back into private employment
5. Private employers, concerned with the efficiency of the workman, and unwilling to accept on their payrolls the indifferent or shiftless
6. The people on relief, perhaps someone who has actually tried out living on a relief budget as Tom did

The 3 to 5 minute talks suggested above merely help to focus the conversation of the group. The conversation which *is* the panel discussion represents a group interested in learning and in contributing information and ideas. It is conversation which sticks to a chosen topic without excursions even into related topics which might take attention from the main topic and the selected sub-divisions of it.

Group Discussion of Accidents—A 79 page (letter size page) pamphlet of the American National Red Cross, Washington, D. C., presents "Group Discussion Material on Accident Prevention in the Home—On the Farm." There is a wealth of reference data and of suggestions for handling the 6 topics, which would seem to call for more than 6 sessions.

"This Group Discussion Course on home and farm accident prevention has been prepared for any group of people interested. It is specifically suited for meetings of the Grange, Farm Bureaus, Home Demonstration Clubs, 4-H Clubs, Future Farmers of America, Women's Clubs, Parent-Teachers' Associations, men's organizations, civic and fraternal groups.

"The group discussion method is recommended. The success of the course depends largely on the leader's resourcefulness in stimulating the members of the group to participate in discussions and other activities. This helps not only in retaining their interest, but also to shape their convictions, which are indispensable for individual and social action to prevent accidents at home, on the farm, and in the community. The laboratory method is also recommended. Each member of the group should be induced to experiment with conditions in his home and on the farm that constitute possible accident hazards and to report to the group on results achieved.

An outline of the outline for the second topic, "Falls":

Leader reviews previous discussion . . . Leader announces subject for this session . . . Group members report on falls experienced at their homes and farms . . . Leader presents other typical accident incidents . . . Leader presents some accident statistics in falls ("The Greatest Home Hazard," "The Most Dangerous Age," "The Most Dangerous Room at Home") . . . Group discusses local and state statistics . . . Leader presents a symposium of things to do . . . Group discusses what should be done today; what should be planned today; what habits should be formed . . . Leader assigns members of group to report on home and farm experiences for the next topic.

This question was raised by one health educator who examined this handbook: "I wonder about the psychology of dwelling on gruesome details of accidents in a series of 6 meetings."

The plan, including the provision of varied illustrative material which we cannot take space to describe in detail, suggests an application to other health topics. We would suggest the inclusion of more information about handling discussion. It would seem wise to outline the sessions in a way to encourage more intensive discussion of a limited range of material. The highly desirable group discussion tends to become hop, skip and jump when a wide range of material is offered for consideration.

The People Require to Be Told—Let's read the concluding paragraph of "Relationship of a Rural Health Program to the Needs of the Area," by Dr. Joseph W. Mountin, in *Public Health Reports* (Sept. 10, 1937):

It would appear from the study that health department programs are developed on the assumption that the people require most of

all to be told what is necessary for health. The programs are not designed to cope with those barriers that may so effectually prevent a people from obtaining those things which they need.

In many respects the county health officers, and rural health workers in general, have resources for health education beyond the reach of the city health worker. In the city there can be no such range of personal contacts, and such possibilities for volunteer coöperation as may be found in the smaller communities.

The weak point is in the training of the health worker. There is art as well as procedures and materials in the use of contacts and of volunteers. It calls for a rare type of teacher in public health training schools to help the county and rural workers to learn how to reach their people.

For Conventions as Well as Staff Meetings—When papers are read or talks are made the audience would be happier if the platform should follow the suggestions given below. Some such paragraphs might be printed or mimeographed for the use of all who appear on the programs. Of course the material would be good for use in staff and other house organs.

The suggestions which follow are quoted from *Food Inspector,* New York City Dept. of Health (Aug., 1937):

The bi-monthly pay day meetings (of inspectors) continue to result in some excellent and informative talks on a wide variety of public health topics; the talks given have all been carefully prepared and it is evident that many hours of hard work have been devoted to their preparation. Unfortunately these talks have not been as interesting and effective as they should be. Several outstanding faults that are extremely noticeable are:

1. Most of them have been entirely too long; no one but a finished orator can hold an audience's attention for much more than 15 or 20 minutes.

2. The voices of those reading the report have often been indistinct, the delivery monotonous. Papers have been read rapidly in order to shorten the time, making it difficult to take notes.

3. Construction of sentences and correct grammatical usage has not always been adhered to.

4. The attempt to cover comprehensively an entire field has placed the speaker at a disadvantage. By using all his material in the paper he has kept nothing in reserve for discussion during the question period.

The ability to stand up and state simply and effectively the message you have to deliver is not one that can be acquired in a short time and requires as much study and preparation as the paper itself. A few suggestions offered:

1. Limit yourself to the most important phases of your subject.

2. After you have written your paper, cut it down as much as possible and time yourself so that the entire reading will not be more than 20 minutes.

3. Jot down notes on the probable questions that will be asked and be prepared to answer them.

4. Inform yourself fully on your subject —well beyond the actual substance of your paper.

5. Use care in the selection of good English; avoid grammatical errors.

6. Read slowly and distinctly; look at your audience.

7. Remember that extemporaneous speaking is more interesting to the listener than a written paper—if you have the ability to speak in that way. In general suggestions for the preparation of a paper as made by the Acting Director should be complied with.

Health Education in the Newspapers—In the course of several issues we plan to reproduce samples of typical syndicated material which appears widely in newspapers of Canada and the United States.

This month we sample the Associated Press health column edited by Dr. Iago Galdston.

Associated Press Feature Service —"How's Your Health? Edited for the New York Academy of Medicine by Iago Galdston, M.D. (For Nov. 10.) Colds Prevention—I."

There is much that we can do toward pre-

venting colds and minimizing their severity and complications, even though we aren't yet able specifically to prevent colds.

At present it seems to be quite clear that the common cold is essentially due to a filterable virus—an extremely minute disease-producing agent, too small to be visible even under the most powerful microscope.

Coöperating with the filterable virus are a number of germs (visible under the microscope) which apparently are enabled to set up the inflammatory reactions associated with colds in the tissues previously weakened by the filterable virus.

A cold, therefore, may be thought of as a diseased condition produced by a mixed infection—that is, by a filterable virus and a variety of germs. Knowing this fact will help make clear why we use bacterial vaccines in the attempt to prevent colds. It should also clarify the promise that in the near future we may have a specific virus vaccine against the responsible cold virus.

Since the common cold is an infectious condition, the first item in its prevention is avoidance of contact with the responsible infectious agents. This, of course, is not easy to attain, for in our everyday activities we must come close to individuals who suffer from colds and must handle a variety of objects that are likely to be contaminated with the cold infectious agents.

Even so, we can avoid gross contamination. For it is well established that the body can protect itself, even against highly virulent germs, provided the dose of infectious material is not too great. The surgeon practising careful asepsis knows what scrupulous care he must exercise in keeping himself, his instruments, and the field of operation free of bacteria.

The average person, however, is not likely to be fully impressed with the value of "attention to details," such as: covering his mouth and nose when he coughs and sneezes; not shaking hands with those who have colds, or with others when he himself has a cold; washing his hands before eating; keeping his hands away from his lips and his mouth; and not putting objects that don't belong there into his mouth.—*Tomorrow—Colds Prevention*—II.

Hygeia, November, 1937—Material to be quoted, background, titles in *Hygeia*, 535 N. Dearborn St., Chicago, Ill., November, 1937, *25 cents:*

Some fallacies about cancer . . . Stop annoying your child (with a mental health "annoyance test") . . . What light for the eyes? . . . Nursing in the home . . . Should cousins marry? . . . Riding for health . . . Clean sports (sanitation) . . . New Orleans Charity Hospital . . . Bad habits in good babies . . . Cancer "cures" and "treatments" . . . How clean is your house? . . . X-rays in sciences and arts . . . Sportsmanship preferred ("the poor little rich boy") . . . 80,000,000 meals! (WPA and underprivileged children) . . . Conserve the child's hearing . . . Thomas Addison ("an acute medical investigator") . . . The cows that had tuberculosis (in story form) . . . New books on health . . . Questions and answers.

In "School and Health":

Building the health curriculum in the high school . . . Conserving energy for growth . . . Survey of a health education program (Ontario, Calif.) . . . The school physician with initiative . . . All in the day's work . . .

"A New Radio Program for Schools" includes topics of the weekly A.M.A. broadcast. This is given over NBC Red Network from 2:00 to 2:30 P.M. (E.S.T.) on Wednesdays. "Suggestions for Teachers" includes teaching outlines, reading references, and suggested projects. Reprints of this section for use in the schools, 25 copies at *50 cents*. Single copies, *5 cents*.

City Health Conservation Contest—In the Fact-Finding Schedule health education is represented under "Community Interest and Education":

1. Is an annual report of health department published? How many copies are distributed? To whom?
2. In what manner and to what extent do local newspapers assist in health education? How many articles sponsored by the health department appeared during the year 1937?
3. How many pamphlets on health were distributed during 1937?
4. How many lectures and radio talks on health were given during 1937?
5. How many moving pictures on health were shown during 1937?
6. What organized plan of education and control is carried on to effect the prevention of auto accidents?

A Syphilis Poster for Sale—For those who use bill board posters it is a real event to find a good one available throughout the country.

We illustrate a 24 sheet poster developed by the New York State Committee on Tuberculosis and Public Health of the State Charities Aid Association in coöperation with the State Department of Health. Both the national and the New York state outdoor advertising associations have officially approved the poster, and have agreed to coöperate in providing free space and posting service.

Of this poster State Commissioner of Health Edward S. Godfrey, Jr., says:

> "The eradication of congenital syphilis is predicated in large measure upon the early diagnosis and treatment of the syphilitic expectant mother. By emphasizing the need for careful physical examination and blood testing early in pregnancy, this poster should be a material aid to health agencies and officials in their efforts to secure complete coöperation of the people in preventing the prenatal transmission of this disease."

For sale in the United States and Canada, delivery early in 1938, at $1.50 a poster, plus shipping charges. Write to State Committee on Tuberculosis and Public Health, 105 E. 22d St., New York, N. Y.

The direct message, in the lower box, is so worded as to be especially effective, as indicated by Dr. Godfrey. We wish that the artist had been induced to letter "Born" along with "Healthy" on the second line. Thus the *full* force of the top message would be more sure to reach the rapidly passing automobile reader.

DATES AHEAD

Do we have a "Dates Ahead" file? A set of 12 folders, one for each month? And do we drop into those folders any clippings or memoranda which may be ready for consideration as needed? Christmas and the holidays period may give point to selected health messages.

Some departments and associations have given a holiday touch to their house organs. Some have issued Christmas greetings. In this connection good use has been made of the office mimeograph or multigraph.

The *first day of winter* is Dec. 22 this year. It may be made an accent point.

The health department may well be represented in local community affairs. And if "everybody is doing" something or other may not the health agency staff be included?

Jan. 21, 1938, is the closing date for the *Gorgas Essay Contest*. This is open to third and fourth year high school students. Your high school may not have learned about this contest. Or, you may be able to help in providing reference material. For full

Safeguard Baby's Right to be Born
Healthy
EVERY EXPECTANT MOTHER SHOULD
GO EARLY TO A PHYSICIAN FOR AN
EXAMINATION AND BLOOD TESTS

details address Gorgas Memorial Institute, 1835 Eye St., N. W., Washington, D. C.

Please send to the editor any dates you will utilize, any topics for certain months, any ideas for carrying health messages through the calendar.

FOR EDUCATION AND REFERENCE

"Blindness Prevention." Review of the field. National Society for Prevention of Blindness, 50 W. 50th St., New York, N. Y. 6 pp. *5 cents.*

"Ten Questions the Intelligent Citizen Should Be Able to Answer Regarding the Federal Housing Act of 1937." National Public Housing Conference, 112 E. 19th St., New York, N. Y. *Free.*

"Watch Out for Scarlet Fever." Line cuts and limited words. State Dept. of Health, Albany, N. Y. 6 pp.

"What You Should Know about Eyes," by Park Lewis, M.D.; "Venereal Diseases," by William F. Snow, M.D.; "Exercise and Health," by Jesse Feiring Williams, M.D. Three titles in National Health Series, edited by National Health Council, published by Funk and Wagnalls Co., 354 4th Ave., New York, N. Y. New or 1937 editions. *40 cents* by mail, 3 for *$1.10.* Cloth bound, 4 by 6 inches, 70 to 100 pages. A series to be pushed where there are opportunities for selling to those who will read a small book. For sale by A.P.H.A. Book Service.

A.I.C.P., 105 E. 22d St., New York, N. Y.:

"Family Health Series": "Child Development"; "Syphilis"; "Tuberculosis"; "Cardiac Conditions." Small, planagraphed pamphlets for use of nurses in teaching families. Single copies, *6 cents.* Low rates in quantities. Have been translated into Japanese and Spanish. Available in Japan and Cuba.

American Medical Assn., 535 N. Dearborn St., Chicago, Ill.:

"The Truth About Acidosis." 2 pp. *5 cents.*

"Diabetes, Doctors and Dogs." 8 pp. *10 cents.*

"Dental Nostrums and the Public Health." 30 pp. *10 cents.*

"A New Radio Program." Folder. *Free.*

American Social Hygiene Assn., 50 W. 50th St., New York, N. Y.:

"Prostitution in the U. S." 18 pp. *10 cents.*

"Medical Social Service in Syphilis Clinics." 5 pp. *5 cents.*

"Social Hygiene Education in a City of Medium Size." 18 pp. *10 cents.*

"What You Should Know About Syphilis and Gonorrhea." 72 pp. *15 cents.*

Massachusetts Dept. of Public Health, Boston:

"Are You As Attractive As Nature Intended You To Be?" Score yourself and see. 4 pp.

"Vitamin C Foods Each Day." 4 pp.

"Food Wise—Money Wise." Food budgeting; and information sources. 15 pp.

From State Board of Health, Dover, Del., two items which don't look like health department publications. "To the Expectant Mothers" is a small folder, readable in appearance . . . "Some Thought for Food" is a booklet, larger page. It quotes Dr. Sherman on "an optimum diet," but does not explain what an "optimum" is. "The Pattern Menu" is an interesting idea. To one reader the column headed "Daily Pattern," part of a two page spread needs further explanation to make clear its relation to the adjoining columns showing light and medium menus. "Fats," "Sweets," etc., appear under "Daily Pattern," but not under "Light" or "Medium" menus for any of the three meals for the day . . . Delaware also has small folders on syphilis and gonorrhea, inexpensive but readable.

LISTS OF PUBLICATIONS

"Health Education Publications." National Education Assn., 1201 16th St., N. W., Washington, D. C.

"Health, Diseases, Drugs, and Sanitation"; "Animal Industry, Poultry and Dairying"; "Foods and Cooking." Lists of government publications. Supt. of Documents, Washington, D. C. *Free.*

"Health and Medical Economics"; and "Hospital Housekeeping and Management." Lists of free or inexpensive materials. *American Journal of Nursing,* 50 W. 50th St., New York, N. Y. Sept.-Oct., 1937. *35 cents* each.

"'NOPHN' Interpreted." A dialogue in a Pullman car in which specific publications of NOPHN are linked with situations and problems. *Am. Journal of Nursing,* 50 W. 50th St., New York, N. Y. Sept., 1937.

MAGAZINE ARTICLES

A minor, but exceedingly useful health education opportunity is offered in the health articles in periodicals.

A first use for them is to bulletin new articles to the health department or health association staff. Use the bulletin board, the staff house organ, or a simple mimeographed sheet.

Familiarity with the current articles will enable staff members to do more talking on current health topics in their personal contacts. Many times there will be natural opportunities for staff members to refer to one of the current articles.

Again some of this popular material may show staff members how to make annual reports, talks, articles, folders more interesting and effective.

Staff members may be invited to report magazine articles to supplement the lists appearing in this department.

"It was the most delightful piece of twaddle I've read in a long time," said Dr. Francis Carter Wood, as reported by New York *World-Telegram,* referring to the magazine article, "Is Milk Cancer's Ally?"

"The Modern Method of Birth Control," by Dr. T. S. Welton. Book condensed in *Book Digest,* 350 East 22nd St., Chicago, Ill. Aug., 1937. *25 cents.* Cycle or rhythm control.

"Carelessness: Public Enemy No. 1," by C. Wood, condensed from the book. *Book Digest.* Oct., 1937. *25 cents.* Automobiles, fire industrial accidents, and disease.

"By Popular Request." Editorial. *Colliers.* Birth control in many countries. The A.M.A. action: "The doctors did not advocate or oppose birth control. They merely recognized a fact"; "Keep Cool," by Dr. V. G. Heiser. ("See that you are ventilated, and not too well fed." Some experiments in the tropics.) *Colliers.* July 17, 1937.

"Thou Shalt Not Kill," by J. T. Flynn. *Colliers.* Highway tragedies as reduced in Nashville, Evanston, and Milwaukee. Sept. 4, 1937.

"What Do You Pay for Speed?" (editorial), and "The Rats Said Yes" ("hope to millions of beriberi sufferers"), by J. D. Ratcliff. *Colliers.* Oct. 9, 1937.

"Bathing Your Way to Beauty," and "When They Get Colds." *Farmer's Wife,* St. Paul, Minn. Nov., 1937. Copy *free* to health workers.

"American Medical Association and U. S. Public Health Service Join in Syphilis War With Movie" (a page); "The Frontier Service Brings Health to Kentucky Mountaineers" (4 pages); "Hygiene Exhibit Models in Vienna Show How Man Sees and Hears" (giant reproductions). *Life,* 350 East 22d St., Chicago, Ill. *10 cents.*

"Millions Suffer from These—Hay Fever, Asthma, Hives—What Causes Them and How Science is Treating Them." 6 pages of pictures and captions with a circulation of 2,000,000. *Look,* Des Moines, Iowa. Aug. 17, 1937. *10 cents.*

"English Children Learn How to

Drive Safely" (devices used with school children); "Giving Premature Babies a Chance to Live"; "Bone Carpentry"; "Ozzie," the car driving menace; "The Story of a Kiss" (and its health danger); etc. *Look*. Sept. 28, 1937. *10 cents.*

"Science Comes to the Aid of Crippled Children" (2 pages); and "Street Corner Drama: Who Caused the Wreck?" (2 pages). Also 4 pages on civil liberties. *Look*. Oct. 26, 1937. *10 cents.*

"Do You Know That the U. S. Has the World's Worst Slums?" (6 pages). *Look*. Nov. 9, 1937. *10 cents.* The picture magazine with 2,000,000 circulation makes far reaching contributions to health education.

"Keeping (the child) Cool in Hot Weather," by W. H. Irwin. "A (junior high) School Becomes Safety Conscious," by D. Osborn. *National Parent-Teacher*. 1201 16th St., N. W., Washington, D. C. July, 1937. *15 cents.*

"Lifesavers of the Bush," Sir James Barrett (nursing on Australia's frontier); "Safety Work at the Crossroads," by A. W. Knight (roadside first-aid). *Rotarian*, 35 East Wacker Drive, Chicago, Ill. Aug., 1937. *25 cents.*

"How it Feels to Look Like Everybody Else," by J. Alsop, Jr. *Saturday Evening Post*. Sept. 11, 1937. Reducing by dieting.

"Health Talk." Editorial. *Saturday Evening Post*. Sept. 18, 1937. Against "indiscriminate tooth pulling" and single answer health panaceas. "A Job for the States." Editorial. School building safety calls for legislation.

NEW

Chicago V. D. Bulletin, U. S. Public Health Service in coöperation with Illinois Dept. of Public Health, and Chicago Board of Health. The Oct., 1937, issue (No. 4) includes a description of the educational and medical features of the "Chicago Plan for Venereal Disease Control" which has received widespread newspaper attention.

At least new to this department is *The Food Inspector* (we have just seen No. 2 of Vol. 3), a quarterly issued by the Food Inspectors Assn. of the New York City Dept. of Health. "Timely notes, abstracts of current literature and news published for inspectors of Bureau of Food and Drugs"; 17 letter size pages.

EXHIBITS

A happy example of adaptation of an exhibit to the audience is described in *Health News*, State Dept. of Health, Albany, N. Y. (Sept. 20, 1937):

> An exhibit illustrating the leaflet on "Food and Health from Wild Greens or Pot Herbs in New York State," published by the State Department of Health, has been built by Mrs. Catherine Wood Davis, executive secretary of the Essex County Tuberculosis and Public Health Association. It was designed following the suggestion that garden club flower shows might provide opportunities for health exhibit material.
>
> The display is in three sections with the center panel featuring the name of the leaflet. The other two panels portray specimens of edible greens found this summer in the country. Dr. H. D. House, state botanist, furnished identification for many of the plants. The specimens were pressed, mounted with transparent tape, labeled, and then illustrated with clippings taken from the greens leaflet.

"The Scientific Exhibit, 'The Story of Life,' At the Texas Centennial Exposition, Dallas, Tex., June 6–November 29, 1936" is the title of a 28 page pamphlet with pictures, descriptions of the exhibits, and some conclusions submitted to future exhibitors. Supt. of Documents, Washington, D. C. *10 cents.*

Exhibits presented by American

Medical Assn. in October, as reported in *Journal of A.M.A.:*

Health Week under the auspices of the Fort Wayne Medical Society and Y.M.C.A. officials, Fort Wayne, Ind. Exhibits on The Human Factory, Individual Health and Heart Disease.

Annual Meeting, Vermont State Medical Society, St. Johnsbury, Vt. Exhibits on The Doctor Prevents Disease, Basic Science Laws and Treatment of Early Syphilis.

Health Program sponsored by the Parent-Teachers Association, Rocksprings, Tex. Exhibit on Posture.

County Fair, Tarboro, N. C. Exhibit on Syphilis.

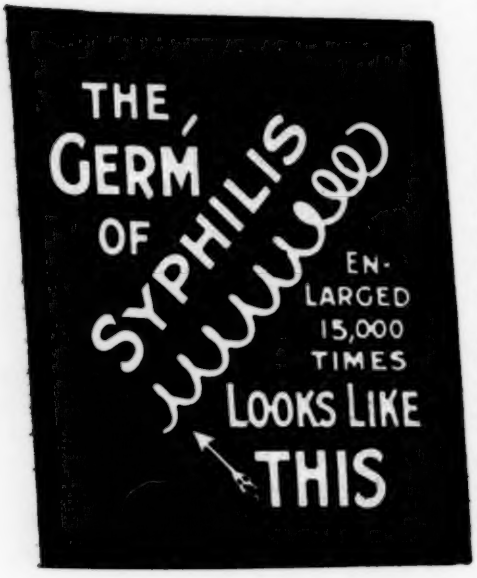
Joint Meeting of Medical Society of the County of Nassau and the Nassau County Cancer Committee, Mineola, N. Y. Exhibit on Cutaneous Granulomas.

Annual Session, American College of Surgeons, Chicago.

Teachers' Convention, Omaha. Exhibit on Health and Hygiene under the auspices of the Omaha-Douglas County Medical Society.

Kent-Sussex Fair health exhibit included syphilis, as described by Mary E. Thomas in *Delaware Health News,* State Board of Health, Dover, Del.

A white plastacele rod, twisted into a regular spiral, mounted on a black satin-finished board and flanked by, "The Germ of Syphilis, magnified 15,000 times, Looks Like This," forcefully drew the attention of Fair visitors and told them the booth below was part of the national fight against the "racial killer."



Brightly executed and smartly illustrated exhibits within the booth advised that "Syphilis is a Disease, Not a Disgrace," "Syphilis Wrecks Marriages," "Syphilis Strikes One Out of Ten Adults," "New Cases of Syphilis and Gonorrhea Lead in Delaware," "10.28% of Insanity in Delaware is Due to Syphilis . . .," untreated syphilis in expectant mothers will cause disastrous results to 83% of their babies, and "Scandinavia Conquered Syphilis—So Can We!" Strong, shaded lights washed attention-drawing illumination across the displays, while sufficient white space between exhibits gave an atmosphere of cleanliness and spaciousness.

A "Peep-Show for Education on Syphilis" is described in *Monthly Bulletin,* Indiana Division of Public Health (Oct., 1937). This was shown at the State Fair.

A gruesome, hooded figure made from wallboard, holding in its hands an enlarged photograph of a new-born syphilitic baby, is the background of the exhibit. It is collapsible so that it can be transported by automobile. An interesting series of 6 illuminated transparent photographs illustrate the exhibit. In addition, an automatic balopticon machine is used which shows 26 lantern slides on the subject of syphilis, on a daylight screen. The photographs in the boxes are illuminated by 30-watt lamps and are viewed through an oval-shaped opening about 6 inches in diameter.

The effect of the exhibit is particularly impressive because the message emphasizes the importance of early diagnosis and adequate treatment for syphilitics. The explanations carried by the photographs graphically illustrate the series. The condition of the patient is described on a placard beneath each opening on the separate boxes. The spectators read the inscriptions on each box in the following order (here are two samples):

1. "This man acquired syphilis. He is shown in the secondary stage of the disease. Treatment begun when a sore first appeared would have prevented this stage from developing."

2. "This is a picture showing the sores that have developed on his tongue. He is a dangerous individual and a real threat to anyone with whom he comes in contact."

The Tranquille Tuberculosis Society

won a first prize for its float in the Kamloop, B. C., 125th Anniversary parade. A "S. S. Good Health" was built around a farm truck. A float costing less than $10 won a third prize for Saskatoon, Sask., Sanatorium. Both are illustrated in *Bulletin,* Canadian Tuberculosis Assn., Plaza Bldg., Ottawa, Ont. Sept., 1937.

An almost wholly new exhibit was shown by Illinois State Dept. of Public Health at the Illinois State Fair. Among the displays were the following:

Health Beacon. A towering beacon light, 7 feet high and 2 feet across the base, portrays the principles upon which preventive medicine is founded and the steps of progress in the control of various diseases.

Age Hazards. A series of 14 beautiful oil paintings show the principal hazards encountered during each 5 year period of life by each sex up to age 50 and point out the methods of controlling the hazards.

Industrial Hygiene. Depicts the various occupational hazards found in Illinois and shows how to control them. The mechanical devices used to determine the amount of dust and gas in the air, masks, goggles, and dust collectors, charts and drawings that indicate the potential risks to health in various industries will be shown in this exhibit.

Syphilis. Perhaps the most striking and impressive of all the new displays, this exhibit utilizes automatic lighting, wax and celluloid models, portraits, artistic drawings, and posters to illustrate the prevalence, characteristics, treatment and means of controlling this serious disease.

Tuberculosis. A series of X-ray photographs showing healthy lungs and those with healed and active lesions in various stages of the disease will be displayed. Explanatory charts and posters illustrating important factors in the control program will be included.

Milk. An intriguing mechanical model portrays each step from the cow to the consumer in the production and handling of milk, emphasizing the many points at which contamination may take place and the importance of pasteurization as a safety factor. Charts and posters illustrating how greatly the sanitation of milk has helped in the control of disease will supplement the model.

Sanitation. Models, maps, transparent drawings, and sound movies will be used to show what has and what can be done to protect public and private drinking water supplies and dispose of human and industrial waste products in a safe, sanitary manner. Detailed plans illustrated by models on the construction of wells, sewage plants, and privies will be shown.

Epidemic Diseases. New exhibits on typhoid fever, diphtheria, smallpox, and rabies will show in detail how these diseases are spread, the degree of risk in Illinois and the means of prevention.

Dental Health. A pair of giant teeth, one a cross-section showing in detail the anatomical structure, together with illustrated panels will show the various factors concerned in the building and preservation of sound, durable teeth.

Maternal Hygiene. Models, posters, and charts will portray the important factors in providing good prenatal and obstetrical care and in preserving the health and lives of mothers and babies during the first few hours and days after birth.

The Health Education Coördinator

The possibility of advancing public health through the use of a well trained health education coördinators has been discussed for some time by leaders in the field, and was considered at a luncheon meeting of the Public Health Institute on October 4, 1937. This gathering of nearly 200 people voted unanimously to refer the project to the Council of the Health Education Section for action. The discussion as developed by Professor Turner, the Chairman of the meeting, and others speakers, brought out the following points.

1. Health education has proved its value in both school and community, and up to the present time these two phases of health education have usually been developed separately.

2. The increase in the number of Directors of Health Education in schools has been slow because the average school superintendent and his board do not feel responsible for the health of the community. They feel that the teachers can teach hygiene

without special supervision as well as geography. They think of special subject supervision, not of the possibilities of reducing morbidity through organized and concerted training in healthful living.

3. Workers in health education in schools are recognizing more and more the need for extending the program into the community for the best results.

4. Health officers are increasingly recognizing that the school through health education can further the public health program in immunization, sanitation, and disease control.

5. The number of health education projects in the community is increasing through local, state, and national stimulation to include cancer, syphilis, tuberculosis, diabetes, nutrition, and other health problems. As these activities increase in number there is greater need for their coördination.

6. In many local governmental units there is lack of coördination between the health department and the health program in the schools.

The Plan

The plan discussed involves the use of a health educator well trained in both health and education to be employed jointly by the school department and the health department with possible subsidy from the state department of health and the state department of education. The training of such a person involves the addition of instruction in publicity and popular health instruction to the program of work already set up for the director of health education in schools. Such a worker would divide his or her time between the public schools and the community program.

This is not a new or theoretical proposal but rather the reflection of a procedure which is gradually evolving from our experience in health education. The development of such a plan in connection with county health organization in Tennessee was reported by Dr. H. H. Walker. In Cattaraugus County, N. Y., in the Birmingham, Ala., area, in some of the rural counties in Michigan, in Hawaii and elsewhere we have seen highly successful programs of school health education developed in close coördination with the health department.

There are several possible benefits from the development of this type of organization: (1) The amount of first class health education service in the country is likely to increase through the initiative on the part of health departments and through the possibility of drawing upon two budgets for the employment of an adequately trained individual. (2) Increased funds for this work will commonly be available, not only because two local departments are drawn upon but also because of possible subsidies from the state and federal governments. (3) Training for health educators could be provided on the same basis that it is now being provided for technical workers in other phases of health department activity. (4) Such a plan will provide a continuing link between the school health education program and the educational work of the health department and private agencies in the community.

Many large governmental units will have a health educator in both the school department and the health department. Moreover, there is no thought that a rigid plan will be produced or urged for adoption by all areas. The plan would be flexible and adopted where local school and health administrators believe it to be useful.

The Health Education Section is organizing a committee to look further into this plan and is inviting committee participation from the Health Officers Section and from the U. S. Public Health Service.

BOOKS AND REPORTS

Health Under the "El", The Story of the Bellevue-Yorkville Health Demonstration in Mid-town New York—*By C.-E. A. Winslow and Savel Zimand. New York: Harper,* 1937. 198 pp. Price $2.25.

It was emphasized in early editions of Rosenau's *Preventive Medicine* that the trouble with public health administration in large cities was that it was too far removed from the people. *Health under the "El"* proves the logic of this statement and in a marked measure establishes the fact that the health center has become a most important local vehicle for the fostering of high standards of community health.

Health under the "El" is the well written story of the Bellevue-Yorkville demonstration, which was financed by the Milbank Fund, and set up to study the very best way by which health services might be rendered for 175,000 people residing in an area covering 50 city blocks in New York City.

An interesting chapter of the book is devoted to a picture of morbidity and mortality for this district preceding the demonstration, these figures revealing that the general death rate, the tuberculosis and the infant mortality rates, were higher in this defined area than in New York City as a whole. Refreshing figures are presented showing a picture of a marked improvement in all these fields, following the 10 year demonstration. Of particular interest is the picture of the development of improved interrelation among the health agencies of the district, and the assumption of increasing responsibility for the health program by the City Department of Health.

One of the most important declarations made is "that the things proven of value in this demonstration can be logically adopted beyond the environs of New York City and New York State." Ten years of sound experimentation in district health organization have strengthened the belief of those who are attempting to find out the very best way by which health services might be rendered in local areas, that the properly functioning health center is a logical essential for the best kind of neighborhood health service.

This book is recommended highly to those who are interested in the furtherance of district health organization.

CHARLES F. WILINSKY

Milk Products—*By William Clunie Harvey, M.D., D.P.H. and Harry Hill. London: H. K. Lewis & Co. Ltd.,* 1937. 387 pp. Price, $5.00.

The authors of the excellent British text entitled "Milk: Production and Control" have produced a worthy companion volume on milk products, including ice cream, cream, butter and margarine, cheese, condensed and evaporated milks, dried milks, and various "subsidiary" milk products.

A standard pattern is followed in discussing these subjects, with valuable material on the definitions, properties, food value, bacteriology, epidemiology, processing, and legislative and administrative control of each product. The legislative material is, of course, mainly British, but the other facts are certainly of international significance.

The book is well printed and profusely illustrated. It has a good index,

but no bibliography. It should prove of practical value to all who are concerned with the production and control of the various dairy products.

JAMES A. TOBEY

Sixteenth Annual Report of Ohio Conference on Water Purification held at Columbus, Ohio, September 29–30, 1936.

The physiological effects of fluorides in water, together with methods used for its removal from Ohio water supplies, the corrosive action of various kinds of water on household hot water tanks, operating reports on several water works and various iron removal devices, and a suggested method for making water purification calculations were among the topics of papers read and discussed at the 1936 conference. Discussions on problems of interest to water works operators are given. An author and subject index of reports presented at these conferences during the past 15 years is also included.

F. J. MAIER

General Hygiene and Preventive Medicine—*By John Weinzirl; Edited by Adolph Weinzirl, M.D. Philadelphia: Lea and Febiger,* 1937. 424 pp. Price, $4.00.

This book has the merit of originality in approach. The author recognizes that there must be some valid excuse for another book on hygiene, so explains his ideas at some length. He approaches his subject from the standpoint of the methods employed to control disease and all other material is made subordinate to that end. He describes briefly a number of diseases with the object of "vitalizing" the particular method under discussion. The result of this is that diseases not usually associated and having little in common are presented together simply because they can be controlled to a greater or less extent by the given method. The reviewer does not feel that this is wise, though from the practical standpoint it may have some advantages. A striking example of what this plan leads to is found under the heading, "Public Health Legislation as a Method of Controlling Disease," in which we find Morphinism, Nicotinism, Alcoholism, and Automobile Accidents considered. This arrangement may be allowable for the ordinary college student and social worker who has no expectation of going into the medical profession, but for medical students and nurses, for whom the book is also designed, we believe the idea is wrong.

We doubt also the wisdom of going into treatment even as much as the author has done. This is again exemplified under automobile accidents: "Treatment. Those not killed but seriously injured are usually taken to the nearest hospital where they are given surgical attention." It is hard to see what place these two lines have in a book on hygiene—and being taken to a hospital is not treatment.

We like particularly the historical approach, which indeed we feel is too brief in some cases. We commend also the giving of the derivation of names from the Latin or Greek, as the case may be. This should relieve the student from a good deal of dry memorizing, as the derivations in most cases give a reason for the name, in spite of the fact that the ancient languages are not now a required part of the general education in most of our colleges and universities, as they were formerly.

The book is well written and one can detect the influence of the careful and logical mind which directed the writing. Anyone who was fortunate enough to know the author, as the reviewer did for many years, would expect this.

Some new words of which we cannot approve have been introduced, as "bacterination," meaning the use of dead

organisms to produce immunity, and "toxination," applied to the use of toxins for the same purpose.

While the history as far as given is generally correct, one mistake in dates is repeated several times. The discovery of the tubercle bacillus by Robert Koch, is given as 1881. Koch's preliminary and final papers announcing its discovery were both published in 1882 and this date has been accepted in all literature that we know of.

The printing and make-up are excellent, although there are some curious corrections in red pencil which should have been caught in the proof. On the whole, we like the book, in spite of questioning the wisdom of its arrangement. Perhaps the author has discovered something new and useful in the way of teaching.

MAZŸCK P. RAVENEL

Treatment in Psychiatry — *By Oskar Diethelm, M.D. New York: Macmillan,* 1936. 470 pp. Price, $4.00.

For many years psychiatry has been more or less considered "the weak sister in medicine," perhaps due, in some measure, to the fact that *treatment* in psychiatry has been largely neglected. Diethelm has more than retrieved the psychiatric profession from such accusing fingers in the presentation of *Treatment in Psychiatry,* which is easily the foremost text in its field.

The content and the point of view of this book to a very large extent take root in 10 years of association with Dr. Adolf Meyer, Psychiatrist-in-Chief of the Johns Hopkins Hospital. Students of Meyer as well as his admirers and those who have sought to gain a working knowledge of Meyerian principles are profoundly indebted to the author for such a clear and practical presentation of the province of dynamic psychiatry.

Instead of paying homage merely to disease entities, the book dedicates itself to the understanding of specific persons who are maladjusted because of varying degrees of personality dysfunction. First concern is with an understanding of the facts and factors entering into the problem of the person who is sick rather than with stereotyped, cut and dried symptomatologies which tend to give a pinkish tone of impersonality.

The treatment of major or sweeping personality deviations does not outweigh the attention given to the minor psychoses or psychoneuroses and particularly "the minor personality reactions of everyday life and with reactions to physical illnesses and handicaps." The various psychotherapeutic principles are expertly illustrated in well chosen case presentations. Each chapter is concluded with a bibliography which offers pertinent reading.

A wholesomely critical presentation of psychoanalytic theory, principles, and procedure is included. The limitations of psychoanalytic technic are stated as well as the constructive contribution and stimulus of Freudian psychoanalysis. Although an open mind toward the various schools of thought contributing to psychiatric understanding and practice is espoused, the author at no time loses sight of the need of turning to therapeutic advantage any helps which may further the welfare of the patient. The patient is our main concern; discussion of theory and dialectics herein contributes to "Psychiatrically trained common sense which allows the physician to see and create therapeutic opportunities and deal with them constructively."

This book marks a fundamental advance in psychiatric thinking and practice since it is the first time that Meyerian principles have been so comprehensively and clearly formulated

and illustrated. Every psychiatrist will utilize this book as his therapeutic bible. Herein the medical student as well as the general practitioner may find a mine of information which will clarify his understanding of the varying degrees of behavior and personality deviations from the norm to the sweeping involvements of gross personality disintegration. But it is the sound footing upon a critically seasoned experience which gives substance to optimism in the treatment of the mentally ill that calls forth gratitude for the author of this much needed publication. FREDERICK L. PATRY

A Text-book of Gymnastics (Form-giving exercises)—*By K. A. Knudsen, Translated by F. Braae Hansen. Philadelphia: Blakiston,* 1937. 364 pp. Price, $3.00.

This is a text on "Swedish" gymnastics, originated largely as a system for training Swedish army officers, later becoming medical and corrective in type and objectives, and finally being adapted to school use, especially—in that country—during the triple decade 1890–1920.

The author, Knudsen, late Chief Inspector of Physical Education to the Danish Board of Education, and the translator, Hansen, of State Training College, Haderslev, Denmark, and formerly of the College of Hygiene, Dumfermlin, Scotland, are among the leading authorities in the world on the type of physical education discussed in this text. It is an excellent contribution. Exercises are described clearly, their purpose and effect explained, and ample illustrations provided.

It has great value for the physical educator interested in corrective physical education and for the orthopedist. It has a worthy place in the libraries of teacher training colleges, of medical schools, and of public health departments, especially those responsible—as many now are—for programs for the care and treatment of crippled children.

CHARLES H. KEENE

Atlas of Hematology—*By Edwin E. Osgood, M.D., and Clarice M. Ashworth. San Francisco: J. W. Stacey, Inc.,* 1937. 255 pp. Price, $10.00.

The authors' intent to make this more than a reference book or guide to hematology has been well met. It represents research of practical, everyday application in laboratory medicine and in the practice of medicine and surgery.

The first nine chapters deal with grouped physical signs and symptoms, nomenclature, cell genesis and identification, and a minute description of the various blood cells, their characteristic features, and their associations and findings in disease. Chapters X to XVII inclusive reveal the application of the principles enounced in the preceding chapters to hematologic disease groups and special conditions.

The illustrations alone make this an outstanding book. They are in natural colors and from one type stain —Wright's—except for the special staining required for reticulocyte and peroxidase studies. Since Wright's blood stain is the one generally used in routine laboratory work, this is an added attraction and value. The illustrations portray blood cells in normal and abnormal morphology, in health and various disease complexes, where there are alterations in maturity of cells, types, numbers, etc. The blood pictures are especially grouped for the anemias, polycythemias, leukemias, hemorrhagic diseases, splenic, liver, and lymph node enlargements, sore throat and stomatitis, infections, allergy, and parasitism.

Of much value are the correlated symptoms, signs, and blood pictures of certain conditions and the timely sug-

gestions concerning therapy. The tables are very valuable, their contents well chosen and grouped for rapid and authentic use.

The Appendix is graced with extensive and rather comprehensive references to modern work in hematology, diagnostic and laboratory procedures employed in blood studies, blood findings in commoner parasitic diseases, and methodology.

The introduction of such an extensive revision of nomenclature of personal coinage and individual in type is questioned. The advantages to come from this are doubted. For years much confusion has existed through loose terminology and individual efforts to bring about modification. In this work where new terms are used the author is considerate enough to give always in parentheses the old term most nearly equivalent, and states that this is done "so that usage may decide which term is preferable for use in subsequent editions."

The material in the book is well presented, in good form, in a free, understandable style, and there is an excellent index. It is recommended to technicians, students in hematology, laboratory consultants, practitioners of medicine and surgery, and certain research workers. We know of no better work than this.

M. PINSON NEAL

Everyday First Aid—*By Walter Frank Cobb, M.D. New York: Appleton-Century,* 1937. 269 pp. Price, $1.50.

The book is composed of 25 chapters with foreword, postscript, appendix, and index. Its author is medical examiner, Department of Hygiene, College of the City of New York, and with the first aid service of the American Red Cross.

The discussion in each chapter is arranged in a practical and philosophical manner, the stage being set by a newspaper accident report. This is followed by analysis of the situation, first aid, subsequent history, and comment. Interestingly written with clever free-hand drawings depicting all sorts of mishaps and their immediate care, the book is primarily sound, informative, and intended for the average reader. In the chapter on "First Aid of Asphyxiation" one feels the victim, however, would have passed out long before artificial respiration was applied. We think it is said that 7 minutes without air exchange is the limit for resuscitation. The use of the word "carry" as a noun to describe the "four-hand" seat is probably professional rather than "dictionary."

By its arrangement the book is more a manual for him who would be prepared than for ready reference at the time of mishap, where the Red Cross manual would be much more serviceable, yet it stresses the great importance and methods of first aid in accidental mishaps as well as illness, poisonings, sunstroke, etc. The appendix lists the equipment which should be at hand in the home, the automobile, and for personal use.

EMERY R. HAYHURST

Learning to be Good Parents: Talks to Fathers and Mothers—*By Eleanor Saltzman. Boston: Manthorne and Burack,* 1937. 55 pp. $.25.

This booklet is composed of a number of simple talks to mothers and fathers. The subjects are those of everyday experience in rearing children and in answering their perplexing questions. The talks are presented largely in words of one syllable and in direct, didactic form. They evidently have been prepared for parents of limited education and experience.

In the chapter on growth it is questionable whether parents should be told "Jackie's heart is young and strong,

and he can work hard when he gets to be 14 or 15 . . . Perhaps Jackie's father is a farmer. Let 14 year old Jackie work in the field." The statement that "Liver is cheap and is good food" is certainly true following the conjunction; but it is not always "cheap." The talk on where babies come from is unusually frank. There is very little left to the imagination.

On the whole, this series of talks is based upon modern child study and psychology and is a wholesome attempt to get before parents of average intelligence the important facts.

RICHARD A. BOLT

Children Handicapped by Cerebral Palsy—*By Elizabeth Evans Lord, Ph.D. New York: Commonwealth Fund,* 1937. 105 pp. Price, $1.25.

So long as birth injuries play an important rôle in early infant mortality and in permanent crippling, studies such as this one will prove of value in the diagnosis, prognosis, training, and management of cases of cerebral palsy.

Dr. Bronson Crothers, in his short but comprehensive introductory chapter on *Medical Explanation,* states that "Accidents during labor are, in our opinion, the most important single cause of disability." He believes that few medical men are equipped by training and experience to appraise psychological factors; hence the importance of a guide such as the present one.

Dr. Lord has given us an exceedingly helpful volume including psychological aspects of muscle training, the mental testing program, mental development in relation to educational plans, the teacher's problem, and emotional problems of child and parent. A short, working bibliography appears at the end.

The book is written in an easy, understandable style which should prove interesting to intelligent parents, teachers, and nurses as well as to physicians and physiotherapists. It is practical throughout. The Commonwealth Fund is to be commended for publishing studies of this nature.

RICHARD A. BOLT

Proceedings of the Second National Conference on College Hygiene—*Sponsored by the Presidents' Committee of Fifty on College Hygiene, The National Health Council, and the American Student Health Association. New York: National Tuberculosis Association,* 1937.

This second report is a worthy successor to the first.[1] The introduction particularly shows the need of such conferences, as in 1936 only one-third of the colleges and universities in the country had required courses in hygiene. Many student health services also certainly need direction, organization, and expansion.

The conference has given us reports of a series of studies on hygiene in educational institutions discussing the institutional responsibilities in relation to student health. The report on Student Health Service is practical but sets high standards; that on Health Teaching is sound and practical.

Of special moment is the attention given to mental hygiene. This is generally regarded as an abstruse specialty and it is unfortunately true that the average practitioner does not know much about it, while many of those in charge of student health in our universities have not had the training in the subject which is so desirable. Another striking feature of this report is the attention given to tuberculosis. During the past few years a number of reports on tuberculosis among students in our colleges, universities, and medical schools have been published showing that students should be protected during this formative period.

1. Reviewed in the *A.J.P.H.*, Mar., 1932, page 341.

Tuberculosis in Negro colleges is well considered. In general urban populations the morbidity and mortality among Negroes is three times that if whites but it is said that the incidence of the disease is more nearly equal in college groups.

It is somewhat difficult to review this most interesting and useful publication since the reports it contains are concise. The make-up of the book is good, especially as to headings and subheadings. We commend it heartily to all those interested in the tremendous problems of student health.

MAZŸCK P. RAVENEL

The Psychology of Abnormal People—*By John J. B. Morgan, Ph.D. (2nd ed.) New York: Longmans-Green,* 1936. 605 pp. Price, $3.25.

This well known text again greets the eye of the teacher and student in the form of a second edition which brings the content up to date in the light of the increasing amount of scientific research.

The aim of the book is to interest the student in the scientific aspects of the subject maintaining an eclectic point of view with respect to the various creeds, schools, and cults. These are seen to be less and less subscribed to and complete with the advance in experimental psychology.

Professor Morgan states that the main purpose of the book is, "to aid the readers in understanding the more common weaknesses of human nature to the end that character and personality deformities may be avoided."

The volume is intended primarily for the student of abnormal psychology but may also be read with profit by public men, lawyers, social workers, and parents. In order to give a foundation for the more abnormal aspects of the psychological presentation, considerable space is apportioned to normal psychology.

The first chapter is devoted to the Science and Causes of Mental Disorders. The concept of the abnormal is discussed with commendable insight. Abnormal psychology for the author concerns itself with all degrees of abnormal behavior and personality deviations as well as the full-blown mental disorders. These latter are categorically classified.

The cause-effect understanding of various types of maladjustments in the light of reactions to internal and external stimuli and stress are formulated in a constructive manner. Of special import is the attention given to methods of prevention in the school as a feature for mental hygiene research and practice.

Succeeding chapters are devoted to disorders of sensation, perception and association, delusions, abnormalities of memory, emotional disorders, motor disorders, abnormalities of intelligence, personality, sleep and dreams, suggestion and hypnosis, benign mental disorders, disorders of regression, compensatory and episodic disorders. The final chapter is given over to treatment and prevention.

To each chapter is appended a glossary, projects for further study and well chosen references. This book, although primarily designed to subserve the academic interest of the student of psychology, can well be read by the medical student, and particularly the psychiatrist and all those interested in the broad aspects of mental hygiene. The educator in particular will find a multitude of significant passages which may be turned to good advantage in understanding teacher-child and parent-child relationships.

The training of teachers in mental hygiene and the need of clinical service in the form of child guidance clinics and well trained counselling personnel is emphasized.

The author is to be congratulated in

bringing to a more clarified formulation a second edition of this book which is easily a leader in its field.

FREDERICK L. PATRY

Physiological Hygiene—*By Cleveland P. Hickman. New York: Prentice-Hall,* 1937. 493 pp. Price, $3.25.

This book, designed to be used at the college level, tries to strike a happy medium between the too simple text which fails to arouse interest because it does not stimulate thought, and the too technical which discourages.

While it devotes more space to physiological processes than is usual in books of this aim, it is interestingly written and has large sections (*e.g.*, one on reproduction) that give attention almost wholly to the sociologic and hygienic phases of organic activity. Pages 239 to 454 are devoted wholly to hygiene and public health.

A bibliography, either by topics or at the end of chapters, would be a definite help as an aid to the development of special discussions, or for the study of definite personal or community health problems.

CHARLES H. KEENE

BOOKS RECEIVED

SOCIALIZED MEDICINE IN THE SOVIET UNION. By Henry E. Sigerist, M.D. New York: Norton, 1937. 378 pp. Price, $3.50.

SANITARY INSPECTOR'S HANDBOOK. By Henry H. Clay. 3rd ed. London: H. K. Lewis & Co., Ltd., 1937. 480 pp. Price, $5.00.

TWENTY-FIVE YEARS OF HEALTH PROGRESS. By Louis I. Dublin, Ph.D., and Alfred J. Lotka, D.Sc. New York: Metropolitan Life Insurance Co., 1937. 611 pp. Limited edition for distribution to selected list of libraries and specialists.

INTEGRATION: ITS MEANING AND APPLICATION. By L. Thomas Hopkins. New York: Appleton-Century, 1937. 315 pp. Price, $2.00.

APPENDICITIS—A CLINICAL STUDY. By W. H. Bowen, F.R.C.S. New York: Macmillan, 1937. 202 pp. Price, $2.50.

BABY'S FIRST TWO YEARS. By Richard M. Smith, M.D., Sc.D. rev. ed. Boston: Houghton, Mifflin, 1937. 122 pp. Price, $1.75.

PHENOMENON OF LOCAL TISSUE AND ITS IMMUNOLOGICAL, PATHOLOGICAL, AND CLINICAL SIGNIFICANCE. By Gregory Shwartzman, M.D. New York: Harper, 1937. 461 pp. Price, $7.50.

SAFE LIVING. By C. W. Hippler and Helen Burr Durfee. New York: Sanborn, 1937. 188 pp. Price, $.80.

A PEDIATRICIAN IN SEARCH OF MENTAL HYGIENE. By Bronson Crothers, M.D. Commonwealth Fund, 1937. 271 pp. Price, $2.00.

HEALTH AWARENESS TEST. By Mayhew Derryberry, Raymond Franzen, and William A. McCall. New York: Teachers College, Columbia University. Price, $3.20 per 100; $28.80 per 1,000; Specimen set $.15.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Some **Conclusions about Influenza**—Epidemic influenza is caused by a virus transmissible to ferrets and mice; progress in knowledge depends upon distinguishing the disease from other respiratory infections with which it is confused; there are grounds for hope that a prophylactic measure may be produced.

ANDREWES, C. H. Influenza; Four Years' Progress. Brit. M. J. Sept. 11, 1937, p. 4001.

Aiding the Grim Reaper—Mortality rates of persons with chronic diseases were studied with a view to determining proper insurance premium rates for sub-standard risks (due to medical impairments). Persons who had cancer with operation, syphilis, pleurisy, tuberculosis, among other conditions, had an excess of deaths from 2 to 4 times the expected rates. Syphilis led to an excess of deaths from organic heart disease, nephritis, and cancer. Public health problems are discussed.

BRITTEN, R. H. Risk of Mortality among Persons with Chronic Disease. Milbank Quart. 15, 4:303 (Oct.), 1937.

Tuberculosis Case Finding—In the Mulberry Health District in New York where 80 per cent of the quarters had no central heating plant, 77 per cent had no bath tub, 54 per cent had no hot water, and 48 per cent had no private indoor toilets, a special tuberculosis cast finding program was undertaken covering the families of all new and old cases, the testing of school children, and certain other groups. The value of examining relatives of cases is established, school child tuberculin testing in such an area is questioned, and more study is needed in examining recovered cases of respiratory disease. An excellent report.

DOWNES, J., and PRICE, C. R. Tuberculosis Control in the Mulberry District of New York City. Milbank Quart. 15, 4:319 (Oct.), 1937.

About the Fifth Cause of Death—An excellent summary of the present pneumonia situation. The history is reviewed, modern treatment measures are discussed, and the statistics are given from which it is estimated that 35,500 wholly unnecessary deaths occur from pneumonia each year in the United States. The use of rabbit serum rather than horse serum is discussed.

HORSFALL, F. L. The Control of Lobar PNEUMONIA. Canad. Pub. Health J. 28, 10:476 (Oct.), 1937.

Water-borne Infections—At the close of a panel discussion on gastroenteritis and the water supplies, the following conclusions seemed to be justified: gastroenteritis epidemics may be due to milk, food, and water; water-borne epidemics may be due to bacteria accompanied by organisms of the coli-aerogenes group. It was suggested but not proved that other bacteria not disclosed by standard methods may be the culprits, as might be non-living toxic substances. More study is needed.

LAUTER, C. J., *et al.* How Are Public Water Supplies Related to the Incidence of Gastroenteritis? J. Am. W. W. Assn. 29, 8:1137 (Aug.), 1937.

Health Officers and Mental Health—Advocating preventive mental centers as a part of all public health programs, the author reviews the ups and downs of the agencies designed to promote mental health. Mental hygiene should penetrate all public health work, he says.

LIBER, B. Practical Aspects of Public Mental Hygiene. New York State J. Med. 37, 18:1603 (Sept. 15), 1937.

Shellfish Conditioning—Reporting upon the successful demonstration plant for purifying oysters in tanks, the authors conclude that the plan is commercially feasible.

MESSER, R., and REECE, G. M. Progress in Oyster Conditioning. Pub. Health Rep. 52, 42:1451 (Oct. 15), 1937.

School Health—Suggesting, among many other things, that the N.E.A. undertake a systematic study of health education in the schools to formulate recommendations for the guidance of state programs. Public health problems are discussed for the benefit of school health and physical educators.

MILLER, E. K. Public Health Service and the School Health Program. J. Health & Phys. Ed. 8, 8:455 (Oct.), 1937.

Where Rural Health Funds Come from—Health administrative expenditures in 94 selected rural counties, totaling nearly 30 millions, was at the rate of about 86 cents per capita, made up as follows: through the health department 52 cents; other government agencies 11 cents; nonofficial, the remaining 23 cents.

MOUNTIN, J. W. How Expenditures for Selected Health Services Are Apportioned. Pub. Health Rep. 52, 40:1384 (Oct. 1), 1937.

Testing for Vitamin A Deficiency—Concluding that the biophotometer test does not appear to be an accurate method of detecting mild degrees of vitamin A deficiency in the routine survey of school children, this painstaking research will trouble those who have accepted the enthusiastic earlier reports of this visual method of determining vitamin deficiency.

PALMER, C. E., and BLUMBERG, H. The Use of a Dark Adaptation Technique (Biophotometer) in the Measurement of Vitamin A Deficiency in Children. Pub. Health Rep. 52, 41:1403 (Oct. 8), 1937.

Protecting against Polio—Dissertation on the difficulties of covering the olfactory area in the prophylactic spraying of noses against poliomyelitis infection. Ordinary spraying is ineffectual, says this writer.

PENTECOST, R. S. Zinc Sulphate as a Chemo-prophylactic Agent in Epidemic Poliomyelitis. Canad. Pub. Health J. 28, 10:493 (Oct.), 1937.

Whooping Cough Prophylaxis—Children in a tuberculosis hospital who were immunized against whooping cough with Sauer's vaccine developed the disease almost as frequently as the unimmunized children. The symptoms were milder than in the control group.

SIEGEL, M., and GOLDBERGER, E. W. Active Immunization of Tuberculous Children Against Whooping Cough with Sauer's Vaccine. J.A.M.A. 109, 14:1088 (Oct. 2), 1937.

Gonorrhea—A million have it.

VONDERLEHR, R. A., and USILTON, L. J. The Gonorrhea Problem in the United States J.A.M.A. 109, 18:1425 (Oct. 30), 1937.

ASSOCIATION NEWS

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Frank J. Condon, M.D., Court House, Centerville, Ia., Medical Director Health District 2, State Dept. of Health

C. N. Harris, M.D., Adams Hospital, Hibbing, Minn., Health Director and Co-Chairman of Community Health Committee, Board of Health

Harold R. Hennessy, M.D., Vista, Calif., Medical Officer assigned to CCC Medical Corps

W. J. Willsey, 8 Doering Way, Cranford, N. J., Health Officer

Daniel L. Seckinger, M.D., Dr.P.H., District Bldg., Washington, D. C., Assistant District Health Officer

Cecil A. Z. Sharp, M.D., 621 S. Forest Ave., Ann Arbor, Mich., District Public Health Superintendent, State Dept. of Public Health

Hilla Sheriff, M.D., Spartanburg, S. C., Director, Spartanburg County Health Dept.

Laboratory Section

Eleanor Alexander-Jackson, Ph.D., 44 Morningside Drive, New York, N. Y., Research Bacteriologist, State Dept. of Health

Mildred R. Cate, City Hall, Lynn, Mass., Laboratory Technician, Dept. of Public Health

Paul A. Moody, Ph.D., 197 Howard St., Burlington, Vt., Associate Professor of Zoölogy, University of Vermont

Vital Statistics Section

Mary A. Cleckner, 811 Green, Harrisburg, Pa., Supervisor of Tabulations, Bureau of Vital Statistics, State Dept. of Health

Harry H. Goode, 1860 Morris Ave., Bronx, N. Y., Assistant to Deputy Commissioner, Dept. of Health

Thomas J. Goodfellow, M.D., 20 Arcade Bldg., Saratoga Springs, N. Y., Member of Saratoga County Tuberculosis and Public Health Committee

Joseph Zubin, Ph.D., 50 W. 50 St., New York, N. Y., Psychologist-Statistician, Mental Hospital Survey Committee

Public Health Engineering Section

Harold Romer, 3115 Brighton 6th St., Brooklyn, N. Y., Health Inspector, Dept. of Health

Ramon A. Saavedra, Seccion de Higiene, Panama, Panama, Chief, Section of Sanitary Engineering, National Government.

Karl O. Schafer, 920 E. Catherine St., Ann Arbor, Mich., Sanitary Inspector, Indiana State Board of Health

Industrial Hygiene Section

John E. P. Hellstrom, 215 Central Ave., Louisville, Ky., Vice-President, American Air Filter Co.

William G. Terwilliger, M.D., 7 Hanover Square, New York, N. Y., Medical Director, W. R. Grace & Co.

McIver Woody, M.D., 26 Broadway, New York, N. Y., Standard Oil Company of New Jersey

Food and Nutrition Section

Lester O. Krohn, 1231–55 St., Brooklyn, N. Y., Veterinarian, Dept. of Health

Frank A. Tobin, 225 E. 202 St., New York, N. Y., Inspector of Foods, Dept. of Health

Public Health Education Section

Fred A. Forney, M.D., 341 State Capitol Bldg., Denver, Colo., Director of Tuberculosis Division, State Dept. of Public Welfare

Florence J. Hosafros, Galva, Illinois

Phyllis B. Koehler, 2 W. 43 St., New York, N. Y., Health Education Officer of Irvington House

Robert L. MacCormack, M.D., MacCormack Clinic, Whitehall, Wis., Member, State Board of Health

Iomergene Rowland, 1027 E. Catherine, Ann Arbor, Mich., School Health Educational Work

David A. Van der Slice, M.D., 426 Packard, Ann Arbor, Mich., School Physician

Public Health Nursing Section

Leona R. Adam, R.N., 101 W. Fourth St., Huntingburg, Ind., District Nursing Supervisor, State Board of Health

Marjorie L. Adams, 30 Albemarle St., Springfield, Mass., Consultant in Public Health Nursing, Division of Child Hygiene, State Dept. of Public Health

Dolly I. Bigler, R.N., 1136 Central Ave., Beloit, Wis., Graduate Student

Melida de Roberts, Box 1086, Panama, Panama, Supervisor and Instructor in Public Health Nursing, National Dept. of Health

Edith G. Dykstra, 1143 Haeberle Ave., Niagara Falls, N. Y., Child Welfare Nurse, Bureau of Health

Dorothy Johnston, 205 N. Thayer St., Ann Arbor, Mich., Student

Gertrude P. Lorber, 386 Ledgeview Ave., Fond du Lac, Wis., District Public Health Nurse, State Board of Health

Mary McCormick, R.N., 159 E. Main, Gouverneur, N. Y., District Supervising Nurse, State Dept. of Health

Ethel E. Mull, R.N., 576 Hollister Bldg., Lansing, Mich., Director, Greater Lansing V.N.A.

Gertrude R. Prichett, Hotel Greensbury, Glens Falls, N. Y., District State Supervising Nurse, State Dept. of Health

Eusebia I. Rodriguez, Box 516, Ancon, Panama, Instructor in Public Health Nursing, National Dept. of Health

Lucy Royster, 1309 Washtenaw Ave., Ann Arbor, Mich., District Nurse, Dept. of Health, Durham, N. C.

Mary B. Slattery, 2 Jackson Ave., Middletown, N. Y., District Supervising Nurse, State Dept. of Health

Epidemiology Section

Arthur W. Newitt, M.D., State Dept. of Health, Lansing, Mich., Director, Division of Tuberculosis

Unaffiliated

James M. Dunning, D.D.S., 1 Madison Ave., New York, N. Y., Dental Director, Metropolitan Life Insurance Co.

Charles K. Kincaid, M.D., 218 Elsby Bldg., New Albany, Indiana

Julio Ortiz-Perez, M.D., 3a #274, Vedado, Habana, Cuba

Samuel G. Paulo, 356 Ferry, Malden, Mass., Practising Physician

Robert M. Perlman, 1215 S. University, Ann Arbor, Mich., Student

Jerome S. Peterson, M.D., 380 Monroe St., Brooklyn, N. Y., Assistant Clinic Physician, Tuberculosis Bureau, Dept. of Health

Rolla J. Shale, M.D., 3336 Kildare Rd., Cleveland Heights, O., Student

Miriam R. Sherwood, 26 E. 81 St., New York, N. Y., Student

DECEASED MEMBERS

Elmer G. Balsam, M.D., Billings, Mont., Elected Member 1935

Bradford Massey, M.D., Pocomoke City, Md., Elected Member 1930

Arthur O. Peters, M.D., Dayton, O., Elected Member 1936

Belle M. Wagner, Chattanooga, Tenn., Elected Member 1926

A MESSAGE TO MEMBERS OF THE A.P.H.A.

AT the New York City Annual Meeting, on the recommendation of the Committee on Fellowship and Membership, the Governing Council voted to amend the By-laws so as to permit members of the Association to sponsor membership applications. Heretofore only the signatures of A.P.H.A. Fellows were accepted as sponsors of new members.

Why not exercise your prerogative and sponsor a coworker's application? Blanks will be forwarded on request from the Association office.

ORAL HEALTH GROUP

THE growing interest and increasing participation of dentists in public health work were signalized by the formation of an Oral Health Group at the recent Annual Meeting of the Association. A luncheon meeting, attended by 50 members and interested local dentists and dental health workers, provided an opportunity for an exchange of views.

It was agreed that it was desirable and would probably be mutually helpful if the dental activities of the Association were to have a common focal point in a dental group, with extension of these activities into various appropriate existing sections. It was therefore decided that the dental members be urged to join the sections in which they felt a special interest and carry to those sections the dental viewpoint on problems under discussion. It was decided to postpone for the present, at least, application to the Association for the creation of a dental section.

It was brought out in the discussion that an Oral Health Group might attract to itself not only dentists and dental hygienists, but research workers, nutritionists, public health nurses, and others interested in dental problems. Among the functions of such a group, in addition to those already noted, it was felt that the following would be helpful to the Association and in public health work:

Evaluation of papers and exhibits on dental topics offered to the Association for its programs.

Offer suggestions as to types of dental public health programs in different types of communities.

Carry on appropriate interest in the appointment of dentists to state and local boards of health.

It was decided to hold a meeting at the time of the Annual Meeting of the American Public Health Association, but not conflicting with the sessions of the Association. The temporary officers, Drs. John Oppie McCall, New York, *Chairman*, and Harry Strusser, New York, *Secretary*, were elected until the next Annual Meeting.

EMPLOYMENT SERVICE

The Employment Service will register persons qualified in the public health field without charge. Public health nurses are registered with the Joint Vocational Service, 122 E. 22 Street, New York, N. Y., with which the Association coöperates.

Replies to these advertisements, indicating clearly the key number on the envelope, should be addressed to the American Public Health Association, 50 W. 50 Street, New York, N. Y.

POSITIONS AVAILABLE

The U. S. Civil Service Commission announces an unassembled examination for medical graduates trained and experienced in maternal and child health. Salaries $3,200 to $5,600. Applications close December 28. Circular 96 may be obtained from Commission in Washington or any first class post office.

WANTED—(a) Obstetrician for special demonstrations; public health appointment; South. (b) Public health physician; rural district, southern state; preferably under 35; will provide for special training; $3,600-$4,800. (c) County nurse; duties are largely public health, confined to tuberculosis work; $150, car expenses; midwest. (d) Public

health nurse with knowledge of medical social work required; duties include assistance in direction of clinical experience of student nurses; degree required; $1,900, meals, laundry. (e) Medical social worker for one of New Jersey's leading hospitals; must be thoroughly experienced. (f) Graduate nurse qualified in physiotherapy; must be experienced and capable giving necessary muscle training after care of infantile paralysis patients; $125. #27-PH, Medical Bureau (M. Burneice Larson, Director), Pittsfield Building, Chicago.

POSITIONS WANTED

WANTED—Public health appointments for the following: (a) Well-qualified physician; A.B., M.D. degrees, leading schools; several years' successful practice during which time he held part-time public health position; recently completed graduate training in public health medicine and hygiene. (b) Graduate nurse; B.S. in public health nursing; graduate courses in public health nursing, Western Reserve and Columbia; several years' executive experience in public health work. . . . Upon request from employing officials of public health organizations, further information will be submitted. Medical Bureau (M. Burneice Larson, Director), Top Floor, Pittsfield Building, Chicago.

HEALTH OFFICERS

Physician, M.D., Western Reserve; short course for Health Officers, Johns Hopkins; with county and state experience, wishes administrative or epidemiological position; North or West preferred. **A349**

Physician, M.D., Yale, completing M.P.H. at Columbia; good clinical background; will consider appointment in child health, epidemiology or public health administration. **A350**

Physician, M.D., Northwestern University; Dr.P.H., Yale; will consider appointment in general administration, infant welfare or epidemiology. **A300**

Physician, M.D., University of Georgia; M.P.H., Harvard; experienced in city health administration, will consider an attractive opening in administrative or epidemiological work in South or West. **A206**

Experienced Health Officer who has completed Vanderbilt short course, 1936, will consider appointment. West preferred. **A320**

Physician, age 30; graduate of Indiana University; C.P.H., Johns Hopkins; available for full-time county health work or epidemiology. **A340**

Physician, graduate of Columbia P. & S., with teaching and administrative experience in pediatrics, will consider administrative position in child hygiene. **A341**

Physician, age 33; M.D., University of Wisconsin; M.P.H., Harvard; specializing in industrial hygiene, will also consider general administration. **A342**

Physician, M.D., Ohio State University; C.P.H., Harvard; with special interest in industrial hygiene, will consider position as epidemiologist and health officer. **A345**

Physician, M.D., University of Maryland; C.P.H., Johns Hopkins; broad experience in county public health administration, will consider opening of better class. **A346**

CHILD HYGIENE

Woman physician, M.D., Rush Medical; wishes administrative or clinical position in maternal and child health. **C347**

Woman physician, M.D., Yale; Dr.P.H., Yale; experienced in pediatrics and administration of state bureau, will consider attractive opening. **C348**

STATISTICIAN

Young man with 8 years' experience in public health statistics in well known national organization, and degree in Business Administration, now employed, will consider statistical position or combination with office administration. **A310**

MISCELLANEOUS

Dentist, graduate of Temple University, with excellent postgraduate experience, desires position in administrative aspects of dental hygiene. **M352**

Bacteriologist with training at C.C.N.Y., N.Y.U. and Cornell Medical College, wishes laboratory position in bacteriology; East or Southwest. **M351**

Woman with excellent preparation and wide experience in health education field; organization, administration, supervision and program-making in city, rural and state work. Now employed but would consider good opportunity. $3,500 minimum. **M316**

Experienced teacher, B.S., Massachusetts Institute of Technology, graduate courses Harvard School of Public Health, wishes teaching position or will consider statistical or health education opportunity. **M353**

NEWS FROM THE FIELD

LEAGUE ISSUES REPORT ON NUTRITION

THE League of Nations Mixed Committee on the Problem of Nutrition appointed in September, 1935, has issued a detailed report. It urges governments to adopt a conscious nutrition policy by establishing national committees to ascertain food consumption habits and nutritional status in all sections of the population. Detailed evidence of malnutrition even in the most advanced countries is given in the report, which is intended to be used as a basis for a world nutrition policy during the next few years.

The committee is made up of representatives of the Technical Commission of the Health Committee of the League, the International Labor Office and the International Institute of Agriculture. The United States was represented by Professor E. V. McCollum,* of Baltimore, Md.; Dr. Edwin G. Nourse and Dr. Harold B. Rowe, of the Brookings Institution, Washington, D. C.; Dr. Faith M. Williams, of the Department of Labor, Washington, D. C.; and Professor Warren C. Waite, of Minneapolis.

UNIVERSITY OF CALIFORNIA DEPARTMENT OF PUBLIC HEALTH NURSING

A NEW department of public health nursing has been announced at the University of California at Los Angeles, with Eleanor L. Beebe in charge as Assistant Professor of Public Health Nursing.

SAN FRANCISCO HEALTH EXHIBIT

THE prevention of disease will be the theme of the Health Exhibit planned for the Golden Gate International Exposition in San Francisco in 1939.

A committee composed of representatives of medical and allied agencies in California has been appointed to work out the details of the Health Exhibit with Milton Silverman, head of the Health and Science Division.

BALTIMORE OPENS THIRD HEALTH DISTRICT

THE Baltimore Health Department opened the Southeastern Health District August 16. This is the third of the eight health districts into which the city is being divided. The new unit includes all the first, second, and third wards and that portion of the twenty-sixth ward south of Federal Street with a population of about 100,000 persons; headquarters are established at 901 South Kenwood Avenue.

William H. F. Warthen, M.D.,* Assistant Commissioner of Health, will have direct charge for six months and will be assisted by John A. Skladowsky, M.D., the full-time District Health Officer.

TEXAS PUBLIC HEALTH ASSOCIATION ELECTS NEW OFFICERS

AT its 15th annual meeting, held November 1–3 in Dallas, the Texas Public Health Association elected the following officers for 1938:

President—Benjamin M. Primer, M.P.H., M.D.,† Amarillo
1st Vice-President—Austin E. Hill, M.D., C.P.H.,† Tyler
2nd Vice-President—Frances Gayle, San Antonio
3rd Vice-President—Mervyn B. Starnes, D.V.M.,† Dallas
Secretary-Treasurer—P. A. Kerby, Austin

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* Fellow A.P.H.A.
† Member A.P.H.A.

INTERNATIONAL SOCIETY OF MEDICAL HEALTH OFFICERS

NEW officers of the International Society of Medical Health Officers are announced as follows:

President—Eugene L. Bishop, M.D., C.P.H.,* Chattanooga, Tenn..

Vice-President — Francis E. Harrington, M.D.,† Minneapolis, Minn.

Secretary-Treasurer—Leon Banov, M.D.,* Charleston, S. C.

The International Society of Medical Health Officers is planning to cooperate with the Health Officers Section of the American Public Health Association in the development of a one-day Health Officer's Forum of practical administrative problems immediately preceding the 1938 convention of the Association, October 25–28, 1938, in Kansas City, Mo.

NEW YORK WORLD'S FAIR MEDICAL DIRECTOR

THE appointment of Dr. Joseph Peter Hoguet, of New York, N. Y., as Administrative Assistant and Medical Director of the New York World's Fair of 1939 was announced by Grover A. Whalen, President of the Fair.

In this position Dr. Hoguet will be in charge of the executive and administrative work of the Division of Public Health, Medicine, and Sanitation. He will also be responsible for the health of members of the exposition staff and other employees and of visitors attending the Fair when the latter is opened to the public.

AMERICAN RED CROSS

A SURVEY of the nursing services of the American Red Cross now is under way at direction of Admiral Cary T. Grayson, Chairman, who is seeking recommendations for the future of the services in broader helpfulness to the public.

This review is being made by Alta E. Dines,* Director of Nursing of the New York Association for Improving the Condition of the Poor, whose services have been loaned by that agency to the Red Cross for the purpose. Miss Dines is making her headquarters temporarily at the Red Cross in Washington.

WEST VIRGINIA PUBLIC HEALTH ASSOCIATION ELECTS OFFICERS

NEW officers elected at the meeting of the West Virginia Public Health Association, November 10, are as follows:

President — Reece M. Pedicord, M.D.,† Wheeling

Vice-President—Charles E. Watkins, M.D.,† Fayetteville

2nd Vice-President—W. W. Hume, M.D.,† Beckley

Secretary-Treasurer — Thomas W. Nale, M.D.,† Charleston

NATIONAL SOCIAL HYGIENE DAY

THE second National Social Hygiene Day will be held February 2, 1938. The decision to center attention upon social hygiene activities in February grew out of a series of annual regional conferences and an increasing demand for general participation in early planning for the year's work. The first national observance of this day was so successful and was followed by such favorable comment from all parts of the country that the American Social Hygiene Association was urged to repeat and extend the program with coöperation of other national voluntary agencies. Some other date early in the year may be substituted in any given community to fit in best with other local meetings.

HOME OWNER'S LOAN CORPORATION ORGANIZES HEALTH SERVICE

EMPLOYEES of the HOLC have organized a comprehensive health service, financed by the Federal Home

* Fellow A.P.H.A.
† Member A.P.H.A.

Loan Bank Board and by Edward Filene's Twentieth Century Fund. This experiment in group health service is chartered in the District of Columbia under the name of the Group Health Association, Inc. A clinic headed by Dr. H. R. Brown, of San Francisco, is staffed by 15 specialists. Full hospitalization, ambulance and nursing service are included in the plans of the association. Single employees of HOLC will pay $28.40 a year and married couples, $39.60 for these services.—*The Health Officer.*

COURSE FOR TUBERCULOSIS WORKERS

THE National Tuberculosis Association announces an Institute for the Training of Tuberculosis Workers, to be held under the auspices of New York University, at the office of the New York Tuberculosis and Health Association, 386 Fourth Avenue, New York, N. Y., from January 31 to February 12, 1938.

The registration fee is $10.00, payable at the University on or before the opening day.

NEW YORK HEALTH BOARD BANS LOOSE MILK

MILK sold by the glass in restaurants, soda fountains, and all other food dispensing places in New York City for consumption on the premises where sold, must either be dispensed in original containers or be drawn from sealed dispensing devices satisfactory to the Department of Health after January 1, according to a resolution adopted by the Board of Health. This means the death knell of the insanitary milk pump, the end of milk being poured out of quart bottles which frequently stand open, according to Dr. John L. Rice. It also means a reduction in the possibility of contamination through improper handling and so marks the advent of a cleaner and safer milk era in eating establishments.

Notice of the action of the Health Board was sent all restaurant associations in the city last August.

FEVER THERAPY

THE School of Medicine of the University of Pittsburgh announces the appropriation of $50,000 by the Westinghouse Electric & Manufacturing Company to launch and support a 3 year program of research in fever therapy.

The Westinghouse contribution was made to aid research which may have widespread beneficial effects on the health of persons employed in industry as well as the general public. By agreement between Westinghouse and the University of Pittsburgh, the results will be made available to all medical authorities for use in improving the public health.

UTAH'S NEW HEALTH ASSOCIATION

AT a meeting of public health workers held early in November in Salt Lake City, the Utah Public Health Association was formed and a Constitution and By-laws were adopted which limit active membership to members or Fellows of the American Public Health Association.

It is expected that this new Association will apply for affiliation with the American Public Health Association in the near future.

ANNUAL SCIENTIFIC EXHIBITION

THE Annual Science Exhibition, to be held December 27–30, 1937, in connection with the Indianapolis meeting of the American Association for the Advancement of Science, promises to be a distinctive attraction. The exhibition will be held in Murat Theatre, Indianapolis, Ind., along with registration and

* Fellow A.P.H.A.
† Member A.P.H.A.

general sessions. The different societies will be meeting only a few blocks away, except for the mathematical groups, which will be in session at Butler University.

F. C. Brown, Director of Exhibits, expresses the hope that all members of the association attending the Indianapolis meeting will arrange to spend as much time as possible at the exhibition. Furthermore, he would like to be advised of work that might be incorporated in the exhibition. Address F. C. Brown, Director of Exhibits, American Association for the Advancement of Science, Smithsonian Institute, Washington, D. C.

RICKETTSIAE OF SPOTTED FEVER AND TYPHUS CULTIVATED IN VITRO

DR. Ida A. Bengston, Ph.D.,† of the National Institute of Health, Washington, D. C., has recently cultivated, on artificial media, the rickettsiae of Rocky Mountain spotted fever in 15 passages, and of endemic typhus fever in 17 passages. Heretofore cultivation of the rickettsiae organisms has been possible only *in vivo,* either in animals or on living tissue cultures. The significance of this development is in the relative ease and economy of this method of keeping strains of expensive vaccine.—*The Health Officer.*

PERSONALS

Central States

DR. ALBERT C. BAXTER,† Assistant Director of the Illinois State Department of Health since 1930, has been appointed Acting Director.

KURT CARL BECKER, M.D.,† Director of the Royal Oak District Department of Health, Oakland County, Mich., has been appointed Commissioner of Health for the City of Troy and Miami County, Ohio, succeeding the late EDGAR R. HIATT, M.D.†

DR. BERNETA BLOCK, of Pyengyang, Korea, has been appointed field physician for the Bureau of Child Hygiene and Public Health Nursing of the Michigan State Department of Health, succeeding DR. PEARL A. TOIVONEN, resigned.

DR. MARLIN W. CARLSON, of Ellinwood, Kans., has been named Health Officer of Barton County.

DR. FRANK J. CONDON,† of Fort Dodge, Ia., has been appointed Director of District Health Service No. 2, which commenced operations on October 1 with headquarters in Centerville. The District comprises Clarke, Monroe, Decatur, Wayne, and Appanoose Counties.

DR. THOMAS E. EYRES † has been appointed Health Officer of the newly organized Polk County Health Unit, with headquarters in Des Moines, Ia. HARRY E. RANSOM, M.D.,† Health Commissioner of Des Moines, will coöperate with Dr. Eyres in public health matters affecting both city and county, though the new unit will not serve the city of Des Moines directly. The state will maintain the unit.

DR. HUGO A. FREUND, of Detroit, Mich., has been appointed a member of the Public Welfare Commission of Detroit.

DR. BENJAMIN E. JONES, of Davenport, Iowa, has retired as Supreme Medical Director of the Modern Woodmen of America, after 34 years in the office.

JOSEPH H. KINNAMAN, M.D.,† of Des Moines, Director of the Division of Child Health and Education of the Iowa State Department of Health, has been granted a year's leave of absence to take a course at the Johns Hopkins School of Hygiene and Public Health, Baltimore.

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* Fellow A.P.H.A.
† Member A.P.H.A.

EDWIN H. PLACE, M.D.,† of Burlington, Ia., has been appointed Health Officer for Midland County, Mich., succeeding LESLIE V. BURKETT, M.D.,† of Midland, Mich., who has accepted a similar position in Genesee County, Mich.

DR. CHESTER L. PUTNAM, of Holstein, Ia., has been appointed Field Director for the organization of District Health Service No. 3, which is to comprise 8 counties.

DR. EMILY L. RIPKA has been appointed field physician for the Bureau of Child Hygiene and Public Health Nursing of the Michigan State Department of Health, succeeding DR. VIDA GORDON, who resigned to accept a position with the University of Michigan Health Service.

DR. ERWIN C. SAGE, formerly of Eagle Grove, Ia., has been appointed Medical Director of the Des Moines County Health Unit, succeeding EDWIN H. PLACE, M.D.,† resigned.

DR. ARTHUR W. THOMAS, of Ashtabula, Ohio, has been appointed Chief of the Bureau of Child Hygiene and Maternal Welfare, Ohio State Department of Health, to succeed ABRAM L. VAN HORN, M.D.,† who resigned recently.

DR. EMERY TREKELL, of Wellington, Kans., has been appointed Health Officer of Sumner County.

Eastern States

HAVEN EMERSON, M.D.,* Executive Officer, DeLamar Institute of Public Health, College of Physicians and Surgeons, Columbia University, New York, received an honorary doctor's degree at the recent celebration of the Hundredth Anniversary of the University of Athens, Greece.

JOSEPH P. GAREN, M.D.,† has been promoted in the New York State Department of Health to the position of District State Health Officer and is now stationed at the District Office at Saranac Lake, which includes the counties of Clinton, Essex, Franklin, and Hamilton.

CLIFFORD R. HERVEY, M.D.,* of Oswego, N. Y., retired recently from 20 years' service with the New York State Department of Health.

DR. PHOEBUS A. T. LEVINE, of New York, who has been with the Rockefeller Institute for Medical Research since 1905, has received the William H. Nichols Medal for 1938, the outstanding distinction in chemical science, for his work in the field of biochemistry. The Award was founded in 1902, to stimulate original research. In 1931 Dr. Levine was awarded the William Gibbs Medal of the Chicago Section of the American Chemical Society for his work in the application of organic chemistry to biological problems.

DR. EDWARD H. LINNEHAN, of Brooklyn, N. Y., has been appointed Director of the Medical Service of the United States Steamship Lines.

MARIAN G. RANDALL, R.N.,† a member of the technical staff of the Milbank Memorial Fund, New York, has accepted an appointment as Supervisor of Records and Studies on the staff of the Henry Street Visiting Nurse Service in New York City, beginning January 1, 1938.

LEOPOLD M. ROHR, M.D.,* District Health Officer in charge of the Red Hook-Gowanus Health District, New York City Department of Health, has been appointed Instructor in Clinical Preventive Medicine and Community Health at Long Island College of Medicine, Brooklyn, N. Y.

JOHN M. SCHIFF has been elected President of the Henry Street Settlement, New York, succeeding LILLIAN

* Fellow A.P.H.A.
† Member A.P.H.A.

D. WALD who founded the organization in 1893. Mr. Schiff has served as Vice-President for several years. Miss Wald assumes the title of President Emeritus. Mr. Schiff is Chairman of the Drive for $250,000 which the Visiting Nurse Service, administered by the Henry Street Settlement, is conducting at the present time; over $135,000 has been raised to date.

RICHARD SLEE, M.D.,† of White Plains, N. Y., First Deputy Health Commissioner of Westchester County since 1930, retired October 1.

DR. WILLIAM E. STEELE, of Olympia, Wash., has resigned as Chief Medical Adviser for the State Department of Labor and Industries, to enter private practice in Longview.

DR. WILLIAM J. TIFFANY, Superintendent of the Pilgrim State Hospital, Brentwood, N. Y., has been appointed State Commissioner of Mental Hygiene of New York, to succeed DR. FREDERICK W. PARSONS, who retired October 1.

Southern States

GEORGE MARVIN ANDERSON, M.D.,† of Atlanta, Ga., has been appointed Commissioner of Health of Calhoun County.

DR. HERBERT N. BARNETT, of New Orleans, La., has been appointed Acting Health Director of Bossier Parish, succeeding DR. MURPHY M. SIMS, of Benton, resigned.

DR. BENJAMIN S. BLACK, of Grove Hill, Ala., has been appointed Health Officer of the newly established Clarke County Health Unit.

DR. CLARENCE BURKE BREWSTER, of Fort Worth, Tex., has resigned as Health Officer of Tarrant County, to become School Physician for Fort Worth.

FRITZ A. BRINK, M.D.,* of Blackshear, Ga., has been appointed Director of the newly created Department of Health in Clinch County, with headquarters in Homerville.

WILLIAM D. BURKHALTER, M.D.,† formerly of Rockford, Ala., has resigned as Health Officer of Coosa County to become Assistant Director of the Division of Venereal Disease Control of the Bureau of Preventable Diseases, Alabama State Department of Health. He will be succeeded by DR. WILLIAM H. GOFF, of Glasgow.

R. FRANK CARY, M.D.,† of Dawson, Ga., Health Officer of Terrell County since January, 1936, has resigned.

DR. THOMAS W. COLLIER, formerly of Albany, Ga., has been appointed Health Commissioner of a joint health unit for Toombs and Montgomery Counties, with headquarters in Lyons.

C. B. CRITTENDEN, M.D.,* of Madison, Tenn., has been appointed Director of the Division of Maternal and Child Health in the Kentucky State Board of Health, with offices in Louisville.

DR. WILLIAM M. DICKENS, of Greenville, Tex., has been appointed to the Texas State Board of Health, to succeed the late DR. SAMUEL A. WOODWARD, of Fort Worth.

DR. J. N. DUDLEY † was appointed Health Officer of Northampton County, Va., effective July 1.

DR. MONROE D. EATON, JR., of the Department of Bacteriology and Immunology, Washington University School of Medicine, St. Louis, Mo., has been appointed to the staff of the International Health Division of the Rockefeller Foundation, New York.

CHARLES H. ELLER, M.D., DR.P.H.,* of Richmond, Md., Director of the Bureau of Rural Health, has been

* Fellow A.P.H.A.
† Member A.P.H.A.

appointed Health Officer of the Eastern Health District in Baltimore. He succeeds HARRY S. MUSTARD, M.D.,* who resigned to become the Hermann M. Biggs Professor of Preventive Medicine at New York University College of Medicine, New York.

DR. WILLIAM H. GOFF, formerly of Glasgow, Ky., has been given charge of the Coosa County Health Department, with headquarters in Rockford, Ala.

J. R. JENNINGS, B.S.,* until recently Chief of the Division of Milk Control of the Louisville, Ky., Board of Health, is now associated with the Diversey Corporation of Chicago, Ill.

DR. WILLIAM A. KRIEGER, of Newport, Ky., has been appointed City Health Officer, to succeed DR. JOHN TODD.

CHARLES L. SAVAGE, M.D.,† of Richlands, Va., has resigned as Health Officer of Tazewell, Buchanan, and Russell Counties.

DR. MURPHY M. SIMS, of Benton, La., has resigned as Health Director of Bossier Parish, to engage in private practice in Waskom, Tex. DR. HERBERT N. BARNETT, of New Orleans, has been appointed Acting Director.

DR. WILFRED N. SISK, Assistant Director of the Giles County, Tenn., Health Unit, has been appointed Health Officer, to succeed DR. JOSEPH C. TATUM, resigned.

DR. BROOKS STAFFORD, of Angleton, Tex., has been appointed Health Officer of Brazoria County, to succeed the late DR. SAMUEL B. MAXEY.

DR. ALVIN L. STEBBINS, of Punta Gorda, Fla., has been appointed Health Officer of Manatee County.

DR. JOSEPH C. TATUM, of Pulaski, Tenn., has resigned as Health Officer of Giles County.

DR. WILLIAM M. WEEMS, formerly of Clopton, Ala., has been appointed Health Officer of Palm Beach County, Fla.

DR. HENRY G. WELLS, of Richmond, Ky., has resigned as Health Officer of Madison County.

Western States

JAY D. DUNSHEE, M.D.,* until recently Director of Public Health of Idaho, has been appointed Director of Local Health Administration of Arizona, succeeding A. N. CRAIN, M.D.,* of Phoenix.

CECIL R. FARGHER, M.D., of Wenatchee, Wash.,† Health Officer of Chelan County, was elected President of the Washington State Public Health Association at its recent annual meeting in Tacoma. ROY M. HARRIS, C.E.,† of Seattle, was named Secretary.

DR. EMMETT E. SAPPINGTON † has been appointed temporarily as Assistant Director of Public Health of San Francisco, Calif., pending civil service commission examination.

Canada

DR. DOUGLAS H. FRYER, of Toronto, Ont., has been appointed Health Officer of Greene County, Ala.

Foreign

PROF. ALBERT SZENT-GYÖRGYI, Professor of Medical Chemistry, Szeged University, Szeged, Hungary, has been awarded the 1937 Nobel Prize for Physiology and Medicine, "as a reward for his discoveries on the biological process of combustion, especially in relation to vitamins A and C." Professor Szent-Györgyi has carried on his research in laboratories in Austria, Germany, England, and the United States. He spent some time at the Mayo Clinic, Rochester, Minn., and in Chicago,

* Fellow A.P.H.A.
† Member A.P.H.A.

and has lectured at Harvard University.

DEATHS

DR. FRANCIS W. O'CONNOR, Director of the Department of Tropical Diseases at Columbia University and Associate Professor of Medicine, died October 3, at the age of 53 years.

BRADFORD MASSEY, M.D.,† Deputy State Health Officer and Health Officer of Worcester County, of Pokomoke City, Md., died August 3. He was associated with the Maryland State Department of Health from 1929.

† Member A.P.H.A.

CONFERENCES AND DATES

American Academy of Orthopaedic Surgeons. First West Coast Meeting. Hotel Biltmore, Los Angeles, Calif. January 16–20, 1938.

American Association for the Advancement of Science, and Annual Science Exhibition. Murat Theater, Indianapolis, Ind. December 27–30.

American Association of Medical Social Workers, Seattle, Wash. June, 1938.

American Association of Pathologists and Bacteriologists. Atlantic City, N. J. May 3–4, 1938.

American College of Physicians,. Waldorf-Astoria Hotel, New York, N. Y. April 4–8, 1938.

American Institute of Nutrition. Baltimore, Md. Spring, 1938.

American Medical Association. San Francisco, Calif., June 13–17, 1938.

American Society of Heating & Ventilating Engineers, 44th Annual Meeting. Hotel Biltmore, New York. January 24–28, 1938.

American Statistical Association. (Several sessions on Vital Statistics and Biometrics.) Haddon Hall, Atlantic City, N. J. December 27–31.

American Veterinary Medical Association. New York, N. Y. July 5–9, 1938

American Water Works Association. New Orleans, La. April 24–28, 1938.

California Fruit Growers and Farmers Convention. San Jose, Calif. December 6–8.

Chemical Exposition — Sixteenth Annual. Grand Central Palace, New York, December 6–11.

Congress of American Physicians and Surgeons. Atlantic City, N. J. May 2–6, 1938.

Connecticut Public Health Association. Hotel Bond, Hartford, Conn. December 1.

Dairy Products Association of the Northwest. St. Paul, Minn. April, 1938.

Dental Meeting, Thirteenth Annual. Pennsylvania Hotel, New York, N. Y. December 6–10.

Fifth International Heating and Ventilating Exposition. Grand Central Palace, New York, N. Y. January 24–28, 1938.

Florida Public Health Association. Tallahassee, Fla. December 6–8.

Georgia Public Health Association. Atlanta, Ga. May, 1938.

Iowa Public Health Association. Des Moines, Ia. May, 1938.

Massachusetts Public Health Association. Boston, Mass. January 27, 1938.

Medical Library Association. Boston, Mass., June, 1938.

Mississippi Public Health Association. Second Annual Meeting. Jackson, Miss. December 9–10.

National Conference of Social Work. Seattle, Wash. June 26–July 2, 1938.

National Tuberculosis Association's In-

stitute for the Training of Tuberculosis Workers—to be held under the auspices of New York University. New York Tuberculosis and Health Association, 386 Fourth Avenue, New York. January 31–February 12, 1938.

National Warm Air Heating and Air Conditioning Association. New York, N. Y. January 24–26, 1938.

New Jersey Health and Sanitary Association—63rd Annual Meeting. Princeton, N. J. December 10–11.

New York State Health and Physical Education Association. Syracuse, N. Y., December 26–28, 1937.

Pan American Medical Association—Seventh Cruise Congress to Havana. (Pan American Medical Association, 745 Fifth Avenue, New York, N. Y.) January 15–31, 1938.

Ohio Federation of Public Health Officials. Columbus, Ohio. March or April, 1938.

Second National Conference on Educational Broadcasting. Chicago, Ill. November 29, 30, December 1.

Second National Social Hygiene Day. Theme, "Stamp Out Syphilis—Foe of Youth." February 2, 1938.

Social Work Publicity Council. Seattle, Wash. June 26–July 2, 1938.

Society of American Bacteriologists. Washington, D. C. December 28–30.

United Fresh Fruit and Vegetable Association. New Orleans, La. January 10–13, 1938.

Western Branch, American Public Health Association. Portland, Ore. May 30, 1938.

FOREIGN

International Organisation Against Trachoma (during meeting of the International Council on Ophthalmology). Cairo, Egypt. December 8–14.

World Conference on Leprosy. International Leprosy Association. Cairo, Egypt. March 21, 1938.

Hawaii Territorial Medical Association. Honolulu, T. H. May, 1938.

Scientific Congress of Doctors and Dentists—"ARPA." Prague. July 21–25, 1938.

British Dental Association. Belfast. July 29–August 3, 1938.

International Congress of Obstetrics and Gynecology. Amsterdam, The Netherlands. May 4–8, 1938.

International Meeting for Cell Research. Anatomical Institute, Zurich, Switzerland. August 7–13, 1938.

Sixteenth International Physiological Congress. Zurich, Switzerland. August 14–18, 1938. All members of physiologic, biochemical, experimental pathologic and pharmacologic institutes or laboratories are entitled to participate; others must be recommended.

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CANADIAN PUBLIC HEALTH ASSOCIATION
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SUPPLEMENT TO AMERICAN JOURNAL OF PUBLIC HEALTH,
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The Educational Qualifications of the School Physician

Report of a Committee of the American Association of School Physicians

AMERICAN PUBLIC HEALTH ASSOCIATION
50 West 50th Street, New York, N. Y.

The Educational Qualifications of the School Physician*

THE rapid development of health programs in the public schools within the past several decades has created widespread interest among members of the medical and public health professions. Problems of school health and hygiene now engage the attention of approximately 2,000 health officers and school physicians in the United States and Canada. In a sense, the rapid growth of the American Association of School Physicians during the past decade attests to the interest which these professions have shown toward health problems in the public schools.

In the 41 years during which health officials in the United States and Canada have been professionally concerned with school health problems, very little has been done to prepare them for this field of public service. As a general rule anyone with a medical training and a liking for children was thought to be sufficiently well qualified to carry out the duties of a school physician. Wood [1] in 1912 was perhaps the first to call attention to the inadequacy of this conception. In an address delivered before the Sixth Congress of the American School Hygiene Association, he said, " Physicians require for this field of educational hygiene not only medical training and skill, but an understanding of educational principles and methods." Shortly thereafter, Burnham,[2] another pioneer in the field of school hygiene, stated, " The school physician should not be only a medical expert, but also an expert in school hygiene." These pronouncements in this field have been echoed repeatedly by other leading school hygienists.

Originally the school physician, or medical inspector as he is often designated, was interested primarily in problems of contagion. As the situation unfolded itself to him, however, inspection for the presence of physical defects was deemed of sufficient importance to justify his attention. In turn, problems of school sanitation, ventilation, lighting, exercise, rest, fatigue, posture, immunization against disease, abnormal behavior, and many others have been added to his responsibilities in the public schools. With the growth of the mental hygiene movement, the educator again turned to the physician for assistance; more recently the school physician has been invited to take an active part in the health education programs of the public schools and colleges. In order to become proficient in these many forms of service, it is apparent that additional training is required of physicians other than that which they ordinarily receive in the medical school.

New York State was the first one to require additional training, other than medical, of those physicians employed as full-time medical supervisors part of whose salaries was met by state aid. According to the require-

* Report of a Committee of the American Association of School Physicians.

ments [3] set up in 1928, full-time school physicians in that state, paid in part by state funds, were required to have the following qualifications:

1. Graduation from a medical school registered by the State Education Department, and licensed to practise medicine in New York State
2. One year of acceptance internship or 5 years of successful practice
3. Six semester hours of postgraduate work in a school or schools of medicine in such subjects and in such institutions as were approved by the State Commissioner of Education; the following subjects to be included in the instruction given:
   a. Medical examination of school children
   b. Psychiatric problems of school age
   c. Problems of growth and nutrition
   d. Preventable defects of eyes, ears, teeth, and posture
   e. School sanitation
   f. Communicable disease control
4. Six semester hours in postgraduate work in a school or schools of education in such subjects and in such institutions as were approved by the State Commissioner of Education. The following subjects were suggested:
   a. Principles of health education
   b. Organization and administration of health education in public schools

To meet the semester hours of medical requirements, courses of instruction were set up at the College of Physicians and Surgeons of Columbia University to insure the necessary training for those physicians choosing to enter this field. To date this is the only academic institution which offers a course of instruction specifically for the training of the school physician. However, other institutions, 12 in number, offer courses in public health and education which would be helpful to the physician contemplating a career in school health work. The University of Michigan confers the degree of Master of Science in School Health for those wishing to specialize in this field. This course of instruction, however, is open to all graduate students including physicians.

At present the State Department of Health of Massachusetts encourages school physicians to secure training [4] as follows:

1. Full- or half-time physicians should have in addition to some experience in general practice, either experience or training in public health work and an understanding of physical education, mental hygiene, and the principles of teaching, ability to handle children, tact, and administrative ability.
2. Part-time physicians should have the public health point of view, tact and the ability to handle children, and an appreciation of the importance of the educational aspects of their work.

This form of recommendation is quite typical of the qualifications set up by the other 15 states having mandatory legislation governing medical inspection.

In 1930 the Committee on the School Child of the White House Conference on Child Health and Protection advocated the following training of physicians for school health work:

> Physicians and other members of the school health service should understand and be in sympathy with the educational implications of the school health program. If not already included in their preliminary equipment, a course of training in service should be given to provide them with a reasonable amount of the philosophy and procedures of the educational program.
>
> The school physician should be a graduate of medicine and should possess good clinical judgment. It is desirable that he have some training in public health also. His personality should command the respect of both his professional associates and laymen.[5]

More recently Sundwall,[6] in a paper delivered before the fourth annual meeting of the American Association of School Physicians at Montreal, advocated a curriculum for the purpose of training physicians for the position of director of school health education. In this he included a fundamental training in public health and hygiene, courses in a school of education such as philosophy of education, history of education, school administration, psy-

chology of education, principles of teaching, and special training in methods and materials in health education, methods of teaching health, and school health problems. "No one will gainsay the statement," he says, "that a comprehensive and constructive school health education program can be forthcoming only when all the interests and activities in our public schools dealing directly with the health of pupils are correlated into one administrative unit, and directed by one who is adequately trained to do the job." A committee appointed at this same meeting with Dr. A. O. DeWeese as chairman, gave consideration to the recommendations made by the speaker, and shortly thereafter proposed the following general qualifications for school physicians in charge of health programs.

1. Training in education
2. Experience in teaching in the public schools or college
3. Training experience or contact in health education work in the public schools
4. A degree of M.D. with intern training
5. Administrative ability

The results of the study [7] conducted by the Joint Committee of the American Medical Association and the National Education Association during 1935 to ascertain opinions relative to desirable school health policies, also point clearly to the need for better trained school physicians. "It is encouraging to note," the report states, "that the general demand is for persons with broad professional training (physicians, dentists, and nurses), and for those who add to this professional preparation specific training and (or) experience in the field of child welfare and of school health administration . . ." Over half of the superintendents, parents, teachers, and school physicians consulted in this study advocated additional training other than medical for the school physician.

Evidence contributed by the American Child Health Association in still another study [8] recently made of school health methods in New York City offers additional proof for the need of systematized methods and better training of those doing school health work. "The school medical program as now conducted, is in general one of the least efficient of our public health procedures," writes Armstrong in an article commenting on this study. Emerson [10] sounds a similar warning in an article appearing in the January, 1935, number of the *School Physicians' Bulletin*. "No single official health service costs so much," he writes, "with so little evidence of accomplishment as that provided by health or educational authorities, or by the two combined, for the health protection of school children." Further, he states, "Once professional eligibility requirements for school physicians are established by state and local educational authorities, then physicians will seek, and schools of medicine and public health will offer, special courses to meet the requirements." These opinions and many others of a similar nature point out the necessity for a careful study of the educational qualifications of school physicians.

PURPOSE OF STUDY

Believing that a thorough investigation of the activities and interests of the school physician and medical inspector was in order, the present committee of the American Association of School Physicians has endeavored to secure answers to the following questions:

1. What opinions do leaders in school health work hold as to the training necessary for the school physician and school medical inspector?
2. What educational facilities are available for their training?
3. What are the present activities and in-

terests of school physicians and school medical inspectors?
4. What is the training of school physicians now in service?
5. What duties and training should the school physician have?

METHOD OF PROCEDURE

Because of the limitation of funds available for this study, it was thought advisable to confine the investigation to 4 procedures as follows:

1. A study of the literature relative to expressed opinions of leaders in the field of school health concerning the training of the school physician and school medical inspector
2. Correspondence with physicians and educators whose opinion would be of value in shaping the nature of the investigation
3. A study of the educational facilities in the United States and Canada which offer courses suitable for training the school physician
4. A questionnaire study of:
   a. Present interests and activities of school physicians
   b. Future interests and activities of school physicians (information obtained from school physicians, health officers, health educators, and physicians in academic institutions)
   c. The training of the school physician and school medical inspector (information obtained likewise from school physicians, health officers, health educators, and physicians in academic institutions)

FINDINGS

I. *Literature*—A thorough search of the literature revealed a dearth of material on the subject. Most of the significant references have been already dealt with in the introduction. These and others of significance have been included in the bibliography.

II. *Opinions of physicians and educators*—Some of the most interesting replies elicited from leading school physicians, health officers, and educators are as follows:

Many of the best things in modern education are going to be failures, may even be positively dangerous, unless school physicians are able to help direct educational and guidance policies, as well as they now handle communicable disease control. This is my considered judgment after 20 years of work in health education, teacher-training and school administration.

To this end school physicians must know modern education; they must also know social service and recreational assets of their communities; and above all, they must understand and share the psychological approach to human development.

From our experience, I think educational psychology, with tests and measurements, would be the most useful single course to offer to physicians in education. Student teaching comes next.

EDNA W. BAILEY, PH.D.,
Associate Professor of Education,
University of California

The problem of what curriculum will best train school physicians for their task is a very important and timely one and worthy of careful consideration. As an example of its importance we may point to some of the data in "Physical Defects—The Pathway to Correction." Part of the difficulties revealed in that report were due to the lack of training of the school examiners and part of them were due to methods of organization and the use of the physician.

SAMUEL J. CRUMBINE, M.D.,
Formerly Executive Secretary American Child Health Association

This matter is taken all too lightly by the vast majority of practising physicians, and I feel that those specializing in this branch of service must themselves act as the spearhead in ameliorating conditions. The first step is now being taken by your committee in elevating standards which in turn will lead to adequate postgraduate specialized education and clinical experience.

FREDERICK L. PATRY,
Psychiatrist, New York State Department of Education

The more I read articles written by dentists conducting school dental programs, the more I realize that educational and health authorities ought to set up qualifications for dentists participating in school health programs. As a matter of fact, the Advisory Council on Mouth Hygiene of New Jersey is now working on this question.

J. M. WISAN, D.D.S.,
State Supervisor, New Jersey Department of Public Instruction

We cannot expect any fully trained full-time school health administrators who are public health experts, educators, physical educators, psychiatrists, psychologists all rolled into one until boards of education pay a sufficient salary to allow sufficient time for the health director to acquire all this special training.

G. MORLEY SELLERY, M.D.,
Assistant Health Director, Los Angeles Public Schools, Los Angeles, Calif.

I do not believe we are ready to recommend any particular type of training or advise any special courses. The older type of school health service where the school physician assumed full responsibility for the health of the child is giving way to that where education of the child and coöperative action of the community are the major aspects. This calls for a working knowledge of the principles of education plus considerable ability in sociology.

DON W. GUDAKUNST, M.D.,
Director, School Health Service, Detroit Department of Health,
Detroit, Mich.

The school physicians, both part-time and full-time, should hold a diploma in public health. Only with the highest possible training of the whole personnel of health departments and voluntary health agencies can we expect the best returns. But there is a great difficulty against our ambition to increase such training and this is the appointment of personnel by politicians.

J. A. BAUDOUIN, M.D.,
Professor of Hygiene, University of Montreal, Montreal, Canada

I think training should include at least a short course in all phases of school work, administrative as well as health. If the doctor has taught school he could probably better understand the viewpoint of the teacher. He should also have training in ways of handling school administrators, boards, etc.

CHARLES L. OUTLAND, M.D.,
Medical Director, Public Schools,
Richmond, Va.

Very few school physicians are really qualified to invade the teaching field, which demands skill and special training.

We can best serve the community by sticking to our medical calling, though we should study the allied health fields, and familiarize ourselves with the special areas where our interest and special knowledge can help us make a contribution.

As an administrator I view with respect an applicant for a position who demonstrates his interest in his chosen field by fitting himself by college and home study. We conduct training courses for our medical inspectors and nurses now in service, on a complete series of subjects, so that those who have not troubled to take public health courses previous to appointment, get them anyway. In addition to routine supervision of work done, our medical supervisors conduct quizzes periodically on diagnosis, on the official regulations, etc. We are continually trying to bring up the standards of the backward men. Halfway up the salary schedule, inspectors and nurses are halted in their increments, unless they complete certain education requirements, and receive satisfactory rating for their work.

DOROTHY CHILD, M.D.,
Special Assistant, Division of Medical Inspection, Public Schools,
Philadelphia, Pa.

Training depends on scope of work assigned. The doctor should be a physician in fact as well as name—not a second-rate pedagogue or "social worker." The schools have a limited scope of proper function and a competency in getting results—which is less than is often claimed by educators themselves. This is admitted by their best representatives and should be kept in mind.

LE ROY A. WILKES,
Executive Secretary, Medical Society of New Jersey, Trenton, N. J.

The school physician's training should be intensified along the following lines:

1. Epidemiological procedures
2. School sanitation as concerns school buildings and environment
3. Immunization and its proper interpretation
4. Normal growth and development with particular attention being paid to the A.C.H. index, Dunfermline scale, and Pelidisi index
5. Psychology and mental hygiene
6. Educational guidance, personality tests, etc.

JOHN SUNDWALL, M.D.,
Director of Division of Hygiene and Public Health, University of Michigan, Ann Arbor, Mich.

These replies and many others of similar import serve to illustrate the diversity of opinion existing on this subject. To judge by numbers alone

one may readily conclude that there is a preponderance of opinion favoring additional training for the physician engaged in public school health work other than that received in the medical school. Just what the exact nature of this additional training should be, however, is not apparent from the opinions expressed.

III. *Educational Facilities* — Letters of inquiry were directed to 14 universities in the United States and Canada which offer training in public health for the purpose of ascertaining educational facilities for the training of school physicians. Only one institution, as already mentioned, the DeLamar Institute of Public Health of Columbia University College of Physicians and Surgeons, was found to offer a course of instruction specifically for the training of the school physician. The Division of Public Health at the University of Michigan offers courses leading to a Master's Degree in School Health. These may, however, be taken by either a layman or a physician. Other schools offer fundamental courses in public health; 3 have courses in hygiene. With one exception all schools consulted in this inquiry expressed an interest in the development of a course of instruction for the school physician.

IV. *Questionnaire Study*—A fourth approach to the problem consisted of a questionnaire study by which knowledge was sought of the professional duties and responsibilities of school physicians in service, and from those indirectly associated with school health programs as health officers, and educators.

Three hundred and ninety-four questionnaires were sent to health officers, school physicians, and educators in the United States, and 11 to school medical officers and educators in Canada, or a total of 405 in all.

Of this number, 128, or 31 per cent, have been returned (Table I). Replies have been received from physicians and educators from 30 states in the United States and 2 provinces in Canada. Among the 128 who replied, there were 98 school physicians, 16 health officers spending part of their time on school work, and the remaining 14 included health educators, state supervisors of school health, college physicians, and other specialists in public health.

TABLE I

Types of Health Workers Replying to Questionnaire

Position Held	*No.*
School Physician	
a. Private school	2
b. Public (full-time)	
1. Urban, head of department	42
2. Rural, head of department	1
c. Public (part-time)	
1. Urban, head of department	25
2. Urban, assistant	10
3. Rural, head of department	3
Health Officer (school) Physician, inclusive	
a Full-time	
1. Urban, head of department	6
2. Rural, head of department	4
3. Urban and rural department	6
School Cardiologist	1
School Phthisiologist, state supervisor	1
Professor of Hygiene	1
Professor of Health Education	1
Professor of Public Health Practice	1
Supervisor, health education, State Department of Education	3
Director, Bureau of Communicable Disease and Rural Hygiene	1
Director, Health and Physical Education, State Department of Education	1
Health Educator	7
Director of Health Education, American Medical Association	1
Director, College Health Program	1
School Psychiatrist, State Department of Education	1
Health Director, Teachers College	3
Health Director of Rural School Health Programs	1
School Otologist	1
Others	4
Total	128

In all, 98 school physicians replied; 16 health officers doing school work part-time; the remaining 14 consisted of health educators, state supervisors of school health, college physicians, and other specialists in public health.

By what department are you em-

ployed? Education, Health, or both? Other?—One hundred and fourteen of the school physicians answered this question. The vast majority, 75 in number, or 65 per cent, were employed by boards of education; 16, or 14 per cent, were employed by boards of health; in 14 instances, 12 per cent, the physician was employed by both education and health authority. Private educational organizations accounted for 4, or 3 per cent; 5, or 4 per cent, were employed as college physicians.

Duties of School Physicians: For the 107 school physicians answering the question as to their duties, the following list gives the services most commonly rendered and recognized as appropriate for a school health service:

1. Routine examination or inspection of children in specified grades
2. Special examinations of children referred by nurse or teacher
3. Sanitary inspection of buildings and grounds
4. Certification of children returning to schools after absence
5. Examination of children returning to school after absence
6. Classroom inspection for communicable disease
7. First aid

Health talks to parents, teachers, or pupils were mentioned by over 50 per cent.

Fifty-three, or approximately 50 per cent, carried out immunization against smallpox, diphtheria, or both, in the schools.

Weighing and measuring, testing hearing and vision, and home visiting were carried out by 49.6 per cent of physicians. Approximately 20 per cent delegated this to school nurses.

Examination of teachers and custodians were carried out by 47 per cent of those replying.

Sixty-one, or 57 per cent, conducted clinics of various kinds in association with their work.

Interest in the activities of the school physician was purely one of finding out the frequency with which certain activities are carried out.

Answers to the question as to the grades in which children are routinely examined or inspected showed wide variation. Of the 99 school physicians answering this question only 50 per cent paid special attention to the lower grades. No correlation could be shown between the combination of grades examined and the size of the school population. In all there were 37 different grade combinations mentioned, ranging from examination of the children of only one grade to routine examination of those of every grade from kindergarten to the 12th grade. Twenty-five per cent of the rural school physicians and 22 per cent of those of city schools reported examination of children of all grades. In only two instances was the examination limited to children of one grade (the 10th) in schools of 2 cities of 10,000 to 25,000 population. In 3 city schools the examination was made of children in 3 grades, 1st, 4th, and 7th.

Thirty-five additional duties were mentioned ranging from "holding an annual health week" to "consultation on cases of suspected mental disease." The most common duties mentioned were:

1. Examination of pupils participating in athletic contests
2. Examination of all new students

City School Physicians' Salaries:

a. Twelve Month Employment Period—Ninety-eight physicians (85 per cent) reported this item. For the full-time city school physicians the salaries ranged from a maximum of $7,500 to a minimum of $2,400, with an average of $3,786. In most instances the larger salaries were received by individuals in large city health departments, who in addition to being in charge of school health work, had such titles as Health

Commissioner, or Deputy Health Commissioner.

Salaries:

a. Rural full-time school physicians received a maximum of $4,800 and a minimum of $2,350, with an average of $3,575. With one exception these were health officers doing school health work as a part of their regular duties.

Salaries for school physicians doing school health work in both urban and rural areas were comparable to those of the rural school physicians.

Of the 4 part-time school physicians reporting this item, the maximum salary received was $2,250, and the minimum $240.

b. Nine or Ten Month Employment Period—The full-time urban school physicians working over a period of 9 or 10 months, received salaries ranging from $6,500 to $1,650, with an average of $3,075.

Of the urban part-time school physicians reporting this item, the salaries ranged from a minimum of $180 to a maximum of $3,200, with an average of $1,078. The majority received salaries under $1,500.

One rural part-time school physician received a fee of $.75 for the examination of each pupil. Two others doing both rural and urban work received salaries below $1,500.

Supervisory Duties:

Of the 106 school physicians answering the question as to their responsibility for supervision of the school health program, 96 per cent of the full-time school physicians, and 76 per cent of those on part-time replied that they had supervisory duties, while 4 per cent of the full-time and 24 per cent of the part-time school physicians indicated they were without supervisory duties.

Administration: Sixteen per cent of the 103 physicians replying to the question as to their administrative relation to the superintendent of the school or schools, stated that they were assistant superintendents in charge of the school health program; 68 per cent replied that they acted as general adviser to the superintendent; and the remainder stated that they had little or no direct relationship with the superintendent.

It is encouraging to see that some physicians are included in the school organization on a par with other administrative officers.

Consultant Relationship: Sixty-six per cent of physicians replying to the question as to consultant contact with the superintendent stated that they had frequent consultation with the school superintendent. Twenty-three per cent had infrequent consultations; and 9 per cent replied that they had slight or no contact.

One hundred and three replies were made by school physicians to the question as to their administrative consultant relationship to the physical education program. Seventy per cent stated that they acted as adviser to the physical educator, while 19 per cent had no administrative relationship.

Relation to Physical Educator: Forty-seven per cent replied that they had frequent conferences with the physical educator regarding health problems affecting his program; 36 per cent stated that they had infrequent conferences; and 16 per cent had slight contact.

Nine per cent replied that they were in charge of the physical education program; 74 per cent made special recommendations as the occasion demanded; and 15 per cent had little or no relationship to the physical education program.

Relation to Health Instruction: One hundred and eleven, or 97 per cent, of school physicians replied to the question as to their relation to the program

of health instruction. Twenty-one, or 31 per cent, of the full-time school physicians, replied that they had supervision of the health instruction program; 36 per cent assisted in the preparation and maintenance of courses in health education; 4 per cent maintained a course of instruction for teachers; and the remainder had no relation to the health education program.

Of the part-time school physicians replying to this question, 13 per cent stated that they had supervision of the health instruction program; 31 per cent assisted, while in 1 instance the school physician taught a course in health education. The remainder, 52 per cent, had little or no relation to the health education program.

These replies may be taken to indicate that school physicians, particularly those employed on a full-time basis, are expected to contribute actively to the health education program, thus emphasizing the need for better understanding and preparation along this line (Table II).

TABLE II

Relation of School Physician to Program of Health Instruction

	School Physician			
	Part-time		Full-time	
Health Instruction	*Number*	*Per Cent*	*Number*	*Per Cent*
Supervision of health instruction program	6	13	21	31
Assists in preparing and maintaining course	14	31	24	36
Teaches course in health education	1	2	0	0
Maintains course of instruction for teachers	0	0	3	4
No relation	16	35	9	13
Not designated	8	17	9	13
Total	45	100	66	100

Special Training: Fifty-one per cent of the 111 full-time physicians replying to the question as to the place and content of any special training for school health work, replied that they had had extra training other than medical. Over 25 per cent had had courses in public health, school hygiene and sanitation, health teaching, principles of teaching, physician education, public health administration, physiology of child growth and development, vital statistics, psychology of education, public speaking, and child hygiene. This training was received in 22 different institutions. Sixteen failed to designate the institutions where they had received their training. Columbia ranked first in attendance, Johns Hopkins second, Harvard third, and Massachusetts Institute of Technology and the University of Michigan fourth. Time spent in training ranged from 1 month to 4 years.

Experience: Ten, 11 per cent, replied that they had experience in school health work ranging from 4 to 25 years.

Twenty-three, 27 per cent, replied that they had no training other than regular medical.

Of the 48 part-time school physicians replying to this inquiry, 13, 27 per cent, replied that they had extra training other than regular medical. Over 20 per cent had training in public health, school hygiene, principles of teaching, physiology of child growth and development, public speaking, and pediatrics.

Courses of training ranged from 2 to 12 months in duration. Eight failed to state the length of their training.

Seven, 14 per cent, stated that they

TABLE III

The Opinions of 123 School Physicians, Health Officers, Health Educators, Relative to What the Duties of the School Physician Should Be

Suggested Duties	Answer Given: Yes No.	Yes Per Cent	No No.	No Per Cent	Discussion No.	Discussion Per Cent
a. When more than one physician is employed one should act as supervisor	109	88	7	5	7	3
b. Determination of policies of school health program (all aspects)	86	69	13	10	24	19
c. Should act in advisory capacity to the superintendent	109	88	11	9	3	2
d. Should administer all types of health service and health education in the school	76	61	26	21	21	17
e. Should make regular examinations of children in specific grades	103	83	7	5	11	9
f. Should make special examinations as found necessary	113	91	6	4	4	3
g. Should make examinations of teachers and custodians	78	62	21	17	24	20
h. Should make sanitary inspection of school buildings and grounds	97	78	18	14	8	6
i. Should make daily visits to schools in time of an epidemic	94	76	12	10	17	13
j. Should make examination of children between 14 and 16 asking for work certificates	97	79	18	14	8	6
k. Should make inspection of children entering school after absence from communicable disease	90	73	10	8	23	18
l. Should hold regular office hours for consultation with parents	87	70	18	14	18	14
m. Should hold regular meetings with the teachers	81	65	28	22	14	11
n. Should be in a supervisory position in relation to physical education, home economics (health aspects), and special classes for the handicapped	85	69	16	13	22	17
o. Should make out monthly and annual reports	100	81	13	11	10	8
p. Should do immunization and vaccination	38	30	32	26	53	43
q. Should do some research each year	83	66	27	21	13	10
r. Should either conduct intelligence tests, personality tests, behavior studies, or supervise work of those delegated to do this work	57	46	35	28	31	25
s. Should supervise courses in health instruction	93	75	11	9	19	15
t. Should conduct classes in health instruction for teachers and assist teachers conducting courses for pupils	78	63	23	18	22	17
u. Should supervise education of physically and mentally handicapped children	77	62	21	16	25	21

had experience in school health. This ranged from 2 to 25 years.

Twenty-eight, 58 per cent, had only medical training.

Functions Appropriate for School Physicians: There was great diversity of opinion among the 123 school physicians, health officers, and educators as to the functions appropriate for the school physician. Tabulation of the 21 duties concerning which opinions favorable or otherwise were most commonly expressed gives the results shown in Table III.

Fifty-three, or 41 per cent, of those answering the question as to duties suitable for the school physician suggested a total of 47 additional duties or responsibilities other than the 21 listed above. Those receiving most emphasis included the following:

1. Encourage rapport with family physician, allied social agencies, Parent-Teacher Association, through public health education
2. Examination of candidates for athletic activities
3. Train teachers and nurses in the art of detecting signs of gross physical defects by demonstration, individual advice and conference
4. Grant excuses from gymnasium work

Training Considered Desirable: The question as to desirable training for

school physicians and medical inspectors was answered by 93, 81 per cent, of the school physicians, medical inspectors, and health officers replying to the questionnaire.

Eighty-five, 91 per cent, recommended training in school medical work for the full-time school physician. Topics recommended in order of their importance as expressed by the numerical frequency of their mention in the replies were: school sanitation, epidemiology, pediatrics, physiology of child growth and development, public health, school health problems, nutrition, mental hygiene, and health administration. Each of these was recommended to be included in the training of school physicians by more than 62, 65 per cent, of those answering the questionnaire. Over 50 per cent of those who answered this question recommended that the training of the part-time school physician should include the same topics.

All of the 17 health educators and others not directly engaged in school health work who replied to the questionnaire answered this question. Their opinions were almost identical with those expressed by school physicians. All 17 recommended training in school medical work and nutrition for the full-time school physician. Over 75 per cent recommended training in public health, school medical work, health administration, mental hygiene, principles of teaching as applied to health education, physiology of child growth and development, nutrition, public speaking, school sanitation, pediatrics, epidemiology, psychiatry, and school health problems.

Courses considered by this health educator group to be necessary for the training of the part-time school physician were in most respects identical with those advised for full-time school physicians; physical education and health statistics being the only other topics not included in the list for full-time school physicians.

Other courses suggested for the training of the school physician (both full- and part-time) were in order of apparent importance given, as follows: sociology, abnormal, social and experimental psychology, economics, orthopedics, physical fitness tests, philosophy of social service, hygiene of adolescence, speech correction, sight conservation, and training in the teaching of sex hygiene. One school physician made a commendable suggestion. It was his opinion that whenever a training course for school physicians was given, a period of observation should be arranged for during the course in some educational or health center with opportunity to observe an efficient school health program.

Source of Replies: The geographic distribution of the cities, counties, and institutions of higher education from which the replies to the questionnaire were received included 28 states of the United States and the provinces of Quebec and Ontario in Canada. One hundred and thirteen different communities, educational institutions, or official agencies were represented among the answers, 17 of the replies having been received from persons in 14 different places in New York State, 11 from as many different places in Michigan, 9 each from Illinois, Massachusetts, and Pennsylvania, 8 from New Jersey, and 9 replies from 6 separate places in California. In the case of 13 states, 1 or more replies came from only 1 city or public service. From Quebec 3 replies were received and from Ontario 1.

SUMMARY

1. *Literature*—A survey of the literature revealed evidence from widespread sources favoring special training and

requirements for the school physician and school medical inspector.

2. *Correspondence*—For the most part correspondents were inclined to favor additional training for the school physician other than that received in the medical school. Differences of opinion exist only as to the extent of the training necessary. Some also expressed the objection that present salaries paid to school physicians did not permit the expense of additional training.

3. *Educational Facilities* — Columbia University was found to be the only university offering a course of instruction specifically arranged for the training of the school physician. A survey of subjects offered at the various institutions revealed that the majority offer courses in public health and education; 4 offer courses in school hygiene and health education. With 1 exception, the directors of public health in all schools of public health consulted in the inquiry expressed an interest in the curriculum proposed as a basis for discussion.

4. *Employers of School Physicians*—The majority of school physicians consulted stated that they were employed by boards of education.

5. *Present Duties of School Physicians*—The replies of 50 per cent of the 107 school physicians answering the question as to their duties may be summarized as follows: duties included in almost all instances routine examination or inspection of school children, special examinations, sanitary inspections of buildings and grounds, health instruction of children and parents, immunization against smallpox and diphtheria, certification of children returning to school after an absence due to illness, examination of children applying for work certificates, testing hearing and vision, preparation of reports, classroom inspections for communicable diseases, and first aid. Thirty-five additional duties were mentioned, the most common of which were: examination of athletes, and certifying to excuses from physical training.

Of particular interest was the information relative to the grades in which children were examined as a routine. Eighty-nine physicians replying to this question stated that they examined various grades ranging from kindergarten only, to all 12 grades and the kindergarten; the varieties in practice being expressed in not less than 37 grade combinations. There was found to be no correlation between the grades examined and the size of the school population.

6. *Salaries*—Those school physicians giving full-time service received an average salary of $3,786 in cities, and $3,575 in rural area. Those receiving the higher salaries held such titles as deputy health commissioner or director of another division of a health department. The majority of part-time school physicians received salaries under $1,500, the highest salaries being received by those having specialized training.

7. *Supervision of School Health Programs*—The majority of the physicians answering this question indicated in their replies that they had no supervisory duties.

8. *Relation of the School Physician to Superintendent of Schools*—The majority of physicians indicated that they acted in the capacity of general adviser to the school superintendent. It is encouraging to note that of the 59 full-time school physicians replying, 7 stated that they had the title of assistant superintendent for the school health program. Frequent consultations were had with the superintendent by most physicians replying to the questionnaire.

9. *Relation of School Physician to*

the Physical Education Program—The majority of school physicians stated that they acted in the capacity of adviser to the physical educational department. This advice usually took the form of special recommendations following health examinations of school children. Frequent conferences were held by most school physicians with the physical education director.

10. *Training for School Health Work*—Approximately 50 per cent of the full-time school physicians replying to the questionnaire had obtained additional training beyond that received at the medical school, to fit them for their work in the schools. Over 25 per cent had taken courses of instruction in public health, school hygiene and sanitation, health teaching, principles of teaching, physical education, public health administration, physiology of child growth and development, vital statistics, psychology of education, public speaking, and child hygiene. Since these replies represent a cross-section of school physicians' training over the entire country, it can be taken as an indication of the trend of the times. This information has been indispensable to the authors of this report in forming their opinion as to the course of training which school physicians should have.

As would be expected, part-time school physicians had comparatively less training. It is of decided interest to know that over 20 per cent, however, had received training in public health, school hygiene, principles of teaching, physiology of child growth and development, public speaking, and pediatrics.

11. *Duties of School Physicians*—The opinions expressed by those who answered the questionnaire reveal the need for more careful study of the interests and activities of the present-day school physician. As might be anticipated, these differed widely on such procedures as immunization by the school physician, the carrying out of personality tests and behavior studies, examination of teachers and custodians, and health instruction by the school physician. Of special interest was the almost general acceptance of the principle that the school physician should be especially trained for his work.

Opinions relative to additional duties other than the 21 basic responsibilities suggested in the questionnaire point unmistakably to a wider concept of the function of the school physician than has generally been held by educational authorities or by school physicians. A total of 47 additional duties were mentioned in the answers to the questionnaire, thus indicating the need for further research in this direction.

13. *Opinions of School Physicians Relative to Their Training*—It is clearly evident that school physicians are well aware of the need for additional training other than that received in the curriculum required for the degree of doctor of medicine. Over 65 per cent replying to the questionnaire made the recommendation that additional courses of instruction be made available for the full-time school physician.

14. *Opinions of Health Educators Relative to the Training of School Physicians*—Close agreement was obtained from health educators with opinions expressed by school physicians as to the training of the school physician. The educators, however, were inclined to place more emphasis on specific training in educational problems and procedures.

CONCLUSIONS

1. A majority of the members of the medical profession engaged in school health work have adapted themselves to this newer specialty of medicine and public health by taking additional training in schools of medicine, public health, and education.

2. While there is considerable difference of opinion as to the specific rôle and duties of the school physician, there is fundamental agreement on certain basic activities.

3. Since both the literature referred to and the correspondence with leaders in the field of school health work show general agreement on the necessity of courses of instruction for school physicians, it is only logical that steps in this direction be favored.

RECOMMENDATIONS

On the basis of the findings of this study the committee recommends that the following subjects be included in courses of instruction planned for the training of the school physician:

SUBJECTS IN WHICH TRAINING IS RECOMMENDED FOR THE SPECIAL TRAINING OF THE SCHOOL PHYSICIAN

1. Community Health Problems
2. School Medical Problems
3. Public Health Administration
4. Mental Hygiene
5. Physiology, Child Growth and Development
6. School Sanitation, Epidemiology
7. Pediatrics
8. Psychology of Education
9. Health Statistics
10. School Administration
11. Principles of Physical Education
12. Principles of Teaching, Methods and Materials in Health Education

MINIMUM LIST OF SUBJECTS NECESSARY FOR THE TRAINING OF A SCHOOL PHYSICIAN

1. Community Health Problems
2. School Medical Problems
3. Physiology, Child Growth and Development
4. School Sanitation, Epidemiology
5. School Administration
6. Principles of Physical Education

ADDITIONAL SUBJECTS SUGGESTED AS VALUABLE, BUT NOT INDISPENSABLE

1. Nutrition Work in Public Schools
2. Psychology of Education
3. Philosophy of Education
4. History of Education
5. Public Speaking
6. Child Psychiatry
7. Vocational Education
8. Practice Teaching

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NOTE: The original replies to the questionnaire and the tabular analyses of these are in the hands of Dr. Kleinschmidt, the chairman of the committee, and will be made available to students of this problem on request.

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Measles and Whooping Cough

Incidence, Fatality, and Death Rates in Thirty-two Cities of the United States, in Relation to Administrative Procedures Intended for Their Control—1924-1933

Report Prepared for the
Sub-Committee on Evaluation of Administrative Practices,
Committee on Administrative Practice,
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By

Haven Emerson, M.D.

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Measles and Whooping Cough

The Incidence, Fatality, and Death Rates in Thirty-two Cities of the United States in Relation to Administrative Procedures Intended for Their Control— 1924-1933

I

Introductory

AMONG the primary obligations of a health officer is that of determining whether significant results are in fact following the employment at his order of procedures, theoretically justified, or traditionally required, with the object of reducing sickness and loss of life from communicable diseases.

Several methods of approach have been used in attempting to measure the results of such procedures, and they fall, in the main, under the following 4 categories:

1. Statistical evidence of deviation from the natural curve of epidemic incidence during an outbreak of a communicable disease, so far as such change in the natural expression of the disease can be correlated with a particular measure or measures employed, *e.g.*, abrupt termination of a typhoid epidemic 10 days after pasteurization of a milk supply, or the chlorination of a water supply which has been incriminated as the cause of the epidemic.

2. Epidemiological evidence that the incidence of secondary cases has been reduced by measures directed toward isolation of the patient, or to early detection of new cases, or by the use of precise criteria for release, *e.g.*, Gordon's studies on scarlet fever in Detroit.

3. Epidemiological and statistical evidence of changes in endemicity or epidemic prevalence of a disease, following general, or special group application of specific immunizing procedures, *e.g.*, in smallpox, typhoid fever, and diphtheria.

4. Statistical evidence of changes in the trend of general or specific age death rates, for a particular communicable disease over a period of years, and of case incidence, and case fatality, in relation to routine administrative practice of reporting, placarding, visiting, hospitalization, or specific treatment of patients or protection of contacts.

It is by the use of the last mentioned method that an attempt has been made in this study to learn what, if any, have been the results of current municipal health department practices, so far as these can be related causally to the incidence, case fatality, and death rates of measles and whooping cough per 100,000 of the general population, and for certain age groups.

II

GENERAL STATEMENT OF INFORMATION UPON WHICH THE PRESENT STUDY IS BASED

The health officers of 32 cities * in the United States collaborated in this study by supplying information upon the reported incidence and deaths, and the administrative and educational policies in effect for the purpose of controlling measles and whooping cough during the 10 year period, 1924–1933. To these health officers and their professional, statistical, and clerical associates and assistants we express the grateful appreciation of the Committee on Evaluation of Administrative Practices.

The population of these cities is estimated to have totalled 21,904,758 in 1924, 26,219,638 in 1933.

Classified by size we have the 32 communities arranged as follows:

7 under 100,000 population
4 between 100,000 and 250,000 population
8 between 250,000 and 500,000 population
13 over 500,000 population

The total population at risk cumulated on an annual basis for these 10 years was 240,806,087, and sub-divided by age groups appropriate to this study included:

Persons	*Age*
3,629,277	under 1 year
3,699,470	1 year and under 2
11,818,573	2 to 4 years
40,309,295	5 to 14 years
181,350,472	15 years of age and over, and age unknown

There were 4,419,369 live births in

TABLE I

All Cases and Deaths from Measles and Whooping Cough Reported in the Thirty-two Cities, by Year, and by the Two Quinquennia and the Decennium, 1924–1933

	Measles		*Whooping Cough*	
Period	*Reported Cases*	*Deaths*	*Reported Cases*	*Deaths*
1924	88,892	1,032	33,603	1,120
1925	72,321	682	39,967	1,314
1926	157,847	1,946	35,589	1,275
1927	70,708	421	32,923	843
1928	135,409	1,152	43,617	1,268
1924–1928	525,177	5,233	185,699	5,820
1929	68,636	410	41,948	988
1930	99,439	539	33,002	577
1931	120,242	575	50,642	745
1932	108,255	305	54,664	666
1933	107,796	459	44,350	493
1929–1933	504,268	2,308	224,606	2,469
1924–1933	1,029,445	7,541	410,305	9,289

* Albuquerque, N. M.
Austin, Tex.
Baltimore, Md.
Berkeley, Calif.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Charleston, S. C.
Chicago, Ill.
Cleveland, Ohio
Detroit, Mich.
East Orange, N. J.
Hartford, Conn.
Kansas City, Kans.
Los Angeles City, Calif.
Madison, Wis.
Milwaukee, Wis.
Minneapolis, Minn.
Newark, N. J.
New Haven, Conn.
New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
Providence, R. I.
Racine, Wis.
Rochester, N. Y.
San Francisco, Calif.
Seattle, Wash.
Syracuse, N. Y.
Washington, D. C.
Los Angeles County, Calif.

Los Angeles County is considered as an urban community throughout this report for the sake of brevity of expression.

TABLE II

Incidence, Fatality, and Death Rates for Measles in Eight Cities by Age, Group, and Year, 1924–1933*

Case Incidence per 100,000

Age Graups	*1924*	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930 (Exc. Boston)*	*1931*	*1932 (Exc. Boston)*	*1933*	*1928–33*	*1924–33*
Under 1	881.2	1,181.3	1,463.7	946.6	1,186.8	1,132.0	393.4	1,479.8	693.9	1,129.1	951.6	893.4	1,017.9
1 year	1,911.8	2,914.5	3,482.7	2,114.9	3,547.0	2,796.7	950.9	2,790.0	1,956.8	2,378.9	1,903.2	1,914.9	2,374.4
2– 4	2,572.6	3,608.2	4,995.3	3,163.7	4,544.7	3,783.2	928.3	4,685.7	2,103.4	3,225.8	2,757.2	2,624.3	3,221.2
5–14	1,438.0	1,803.7	2,702.8	2,401.6	2,474.7	2,175.1	564.1	3,944.1	1,529.2	2,130.3	2,569.9	2,073.2	2,028.4
15 and over	34.9	33.4	40.4	43.5	38.9	38.4	9.0	50.0	18.3	19.8	13.9	38.4	29.5
All ages	443.1	572.2	804.4	630.9	726.4	638.3	161.7	956.4	398.4	552.2	591.6	519.7	578.3
							Case Fatality Per Cent						
Under 1	6.9	9.7	7.9	3.8	8.7	7.6	3.9	5.5	1.9	2.1	1.8	3.1	5.7
1 year	4.3	5.6	5.5	5.6	3.7	4.9	3.7	4.8	1.6	1.0	1.4	2.4	3.9
2– 4	0.6	1.0	0.8	0.6	0.7	0.7	0.7	0.7	0.3	0.2	0.3	0.4	0.6
5–14	0.1	0.2	0.06	0.09	0.2	0.7	0.3	0.4	0.3	0.1	0.2	0.4	0.6
15 and over	0.2	0.5	0.2	0.1	0.3	0.2	0.0	0.2	0.2	0.0	0.2	0.1	0.2
All ages	0.8	1.2	0.9	0.5	0.8	0.9	0.7	0.7	0.3	0.2	0.2	0.4	0.6
							Death Rate per 100,000						
Under 1	61.3	114.8	116.7	36.3	101.4	86.5	15.2	81.3	13.3	24.2	17.1	28.0	58.5
1 year	83.4	162.7	190.6	118.6	103.3	89.5	31.8	134.2	31.7	24.0	27.8	46.8	93.8
2– 4	15.3	38.6	39.1	19.2	32.8	28.6	7.1	33.5	5.9	6.7	9.2	11.7	20.4
5–14	1.6	2.7	1.8	2.3	4.3	2.6	0.8	5.3	1.6	1.2	1.7	3.2	2.3
15 and over	0.8	0.2	0.07	0.03	0.1	0.09	0.0	0.09	0.04	0.0	0.03	0.03	0.06
All ages	3.5	6.9	7.1	3.7	5.9	5.4	1.2	5.5	1.2	1.1	1.3	1.3	3.7

* The 8 cities included in these tables were the only ones with complete reports by age groups for the 10 year period: Berkeley, Boston, East Orange, Los Angeles County, Newark, Pittsburgh, Providence, and San Francisco.

TABLE III

Incidence, Fatality, and Death Rates for Whooping Cough in Twelve Cities by Age Group and Year, 1924–1933*

Case Incidence per 100,000

Age Group	1924 (Exc. 5 Cities †)	1925 (Exc. 6 Cities ‡)	1926	1927	1928	1924–28	1929	1930 (Exc. Boston)	1931	1932 (Exc. Boston)	1933	1929–33	1924–33
Under 1	1,029.2	1,559.1	1,532.8	1,346.2	1,724.7	1,476.1	1,648.9	1,105.8	1,694.3	1,804.4	1,704.4	1,599.1	1,544.7
1– 2	1,172.5	1,871.1	1,880.3	1,288.0	1,825.2	1,625.3	1,861.1	1,151.7	1,921.6	1,874.1	1,735.4	1,717.7	1,676.6
2– 4	1,292.3	1,930.0	2,005.3	1,506.1	1,982.4	1,776.5	1,938.8	1,307.9	2,011.5	2,143.1	2,004.3	1,886.8	1,838.8
5–14	445.4	674.8	607.9	524.7	664.5	580.1	758.6	475.8	837.7	832.4	783.2	167.8	674.3
15 and over	7.8	5.7	7.7	3.8	4.8	5.6	4.9	4.6	5.0	6.4	5.3	5.3	5.4
All ages	181.9	267.9	269.6	211.8	273.3	241.1	284.5	183.8	297.9	304.8	283.2	272.7	259.2
Case Fatality Per Cent													
Under 1	14.0	6.7	16.9	11.1	11.8	13.2	11.4	8.7	8.6	6.9	6.1	8.3	10.3
1– 2	5.9	5.5	8.6	5.0	5.0	6.2	5.0	3.5	3.1	3.3	2.4	3.5	4.7
2– 4	1.1	0.9	2.6	1.3	1.4	1.0	0.6	0.7	0.5	0.3	0.5	0.5	1.3
5–14	0.1	0.1	0.25	0.16	0.1	0.1	0.08	0.1	0.07	0.09	0.02	0.07	0.1
15 and over	0	0	0.6	0.6	0	0.3	0	0	0	0	0	0	0
All ages	2.4	2.0	3.2	2.0	2.1	2.4	1.8	1.4	1.2	1.1	0.9	1.3	1.7
Death Rates per 100,000													
Under 1	144.6	180.6	258.7	149.3	203.3	194.2	187.7	96.1	145.4	125.7	103.9	132.6	159.8
1– 2	69.7	101.6	161.9	64.4	91.3	100.9	93.8	40.5	60.4	62.6	40.8	59.9	78.2
2– 4	14.7	16.5	26.3	14.2	17.7	18.5	13.0	9.1	10.3	6.5	11.0	10.1	13.8
5–14	0.4	0.7	1.5	0.9	0.7	0.9	0.6	0.5	0.6	0.7	0.16	0.5	0.7
15 and over	0	0	0.04	0.02	0	0.02	0	0	0	0	0	0	0
All ages	4.4	5.5	8.6	4.4	5.7	5.8	5.1	2.6	3.7	3.2	2.6	3.5	4.5

* Baltimore, Berkeley, Birmingham, Boston, Detroit, East Orange, Los Angeles County, Minneapolis, Newark, Pittsburgh, San Francisco, Syracuse
† Baltimore, Birmingham, Detroit, Los Angeles County, Syracuse
‡ Baltimore, Birmingham, Detroit, Los Angeles County, Minneapolis, Syracuse

these cities in the 10 year period (1924–1928, 2,339,270; and 1929–1933, 2,080,099).

There were reported to the departments of health of the 32 cities the following numbers of cases, and of deaths from the two diseases, for each year of the entire period for the total population (Table I).

The reporting of measles and whooping cough has not been required by the city of Austin, Tex., during the 10 year period.

In certain other cities one or other of the two diseases has not been reported for all years under consideration.

In only 8 cities * have cases and deaths for measles, and in 12 cities † for whooping cough, been recorded throughout the 10 year period, 1924–1933, by the 5 age groups called for in this study. The case incidence, case fatality, and death rates for these cities as a group are given by age and year in Tables II and III.

An answer was sought from the health officer of each city to a series of questions * phrased to disclose the essential details of procedure, followed or required, from the reporting of the case to its discharge from isolation or quarantine, as well as the policy in regard to hospitalization, immunization, visiting nursing for bedside care, and management of children in institutions, so far as they related to these two diseases.

A summary of the information will be given for the cities as a whole, after which an analysis of such relations as appear significant between the incidence and death rates and the procedures of the cities, separately and in groups, will be offered.

* Berkeley, East Orange, Boston, Los Angeles County, Newark, Pittsburgh, Providence, and San Francisco.

† Baltimore, Berkeley, Birmingham, Boston, Detroit, East Orange, Los Angeles County, Minneapolis, Newark, Pittsburgh, San Francisco, Syracuse.

* See Appendix. Questionnaire A for Measles; B for Whooping Cough.

III

ADMINISTRATIVE PROCEDURES AND POLICIES IN EFFECT FOR THE CONTROL OF MEASLES AMONG THE 32 CITIES

I. *Reporting*—Thirty-one cities require reporting. Austin, Tex., does not. Twenty-four require report by mail. Twenty accept a telephone report. Twenty-four require the report on day of diagnosis or within 24 hours. Two accept the report at a later date, as on weekly report card. One city requires report by mail or telephone as soon as possible.

Twenty-eight cities ventured an opinion as to the probable per cent of cases reported as follows:

None	1 city	51–70%	4 cities
20–30%	4 cities	71–90%	11 cities
31–50%	2 cities	91–100%	6 cities

Several cities refrained from offering estimates but consider that the ratio of cases to deaths reported justifies them in believing that the reporting is fair to good.

Baltimore's estimate is "very good."

Birmingham: "Eighty-five per cent based on ratio of 60 cases per death for past 3 years."

Charleston: "Small per cent except in epidemic years."

Kansas City: "All in school children; possibly half of cases of preschool age."

Racine: "Estimation of 95 per cent reporting, based on report of 7,996 cases in 10 years during which period 9,000 live births were registered."

The ratio of reported cases of measles under 5 years of age to live births in the decennium 1924–1933 for 17 cities * which tabulated cases for that age group for the 10 years consecutively was 8.8 per cent.

The ratios of reported cases of measles at all ages to live births for each quinquennium and for the entire decennium for the 30 cities reporting were as follows:

1924–28	22.5%
1929–33	24.8%
1924–33	23.6%

For further details of ratios of cases reported to births, see Chapters VI and VII.

II. *Verification of Diagnosis*—Diagnosis of measles is verified by a physician from the Department of Health in 9 cities, and is not in 21 cities.

Pittsburgh, Providence, Baltimore, Racine, and New York verify cases reported by other persons than physicians, and Milwaukee, New York, Pittsburgh, and Providence verify diagnosis on request by a physician for consultation, or if the case has not been reported as required. Los Angeles verifies the diagnosis only on request; Newark only in selected cases; Syracuse verifies all cases unless an epidemic is definitely under way.

III. *Visits of Investigation and Instruction*—A visit of instruction and education is made at the patient's home on receipt of a report of a case of measles in 24 cities, and is not made in 8 cities. These visits, where made in the 24 cities, are by a physician in 5 of them, by a nurse in 17, and in 2 cities by both doctor and nurse from the health department.

In 2 cities a sanitary inspector makes the only visit, and in 4 other cities a sanitary inspector makes a visit in addition to a visit by a nurse, or physician, or both.

Visits of instruction are made on the second day or later in 2 of the 24 cities. Supplementary notes from statements made by the respective health officers elaborate to some extent the above summary:

Buffalo: Visits and follow-up of cases ordinarily done by the physician in attendance. Physicians from the department are called in only to confirm diagnosis, and physicians and nurses in cases where no private physician is in attendance.

Chicago: About half of the visits of instruction and education are made by nurses and half by well trained lay health inspectors with years of experience. Investigation of suspected cases, or those where diagnosis is to be determined, are made by a medical inspector.

Providence: All cases not reported by a physician are visited by a physician from the department for a verification of diagnosis, and also if the diagnosis is doubtful, the department is glad to have a physician visit any case, with any physician of the department who requests consultation.

Baltimore: Visit of instruction and education made by nurse if case was reported by physician. Visit by physician if case was reported as "suspected measles."

New Haven: Education is confined to instruction of parent that susceptibles must be isolated for the 3 days previous to expected eruption, that case will be seen at the expiration of the 14 day period and checked for school permit, if the case has attending physician. If no physician is in attendance, revisits are made by the nurse, or the parent will be told that the bureau physician will visit as frequently as severity of case, and particularly the age, demands. The nurse at initial visit looks over the family contacts for nasal and ear discharges, culturing such for the hemolytic streptococcus and diphtheria bacillus and isolating such from the case, if cultures are positive.

Racine: Before expected outbreak in 1932, a special pamphlet was prepared, stressing the case of the young child who contracts measles. These were distributed by the nurses only in families where there were cases of measles in children under 5 years of age, or young children who might be

* Albuquerque, Baltimore, Berkeley, Birmingham, Boston, Chicago, Detroit, East Orange, Hartford, Los Angeles County, Newark, New Haven, Pittsburgh, Providence, Rochester, San Francisco, Syracuse.

expected to contract the disease, "our entire emphasis was placed on bed care and isolation of the patient for his own protection."

Los Angeles County: In districts where boards of education hire school nurses, such nurses often visit homes for instruction about measles. Such visits are not routinely made by Health Department nurses, but are made to as many cases as our limited staff will permit. Until recently, a quarterly visit was made to each measles case for 1 year, as a tuberculosis case-finding procedure. Data on school nurse visits are far from complete, so far as particular communicable diseases are concerned.

IV. *Visits during Isolation*—During the period of isolation, visits to the home are made by a representative of the health department in 15 cities and are not made in 14 cities. Where such visits are made, the number and intervals vary widely, in Providence as many as 5 visits being made during the period of communicability, and for exposed susceptibles during the incubation period. Elsewhere 2, and in half these cities 3 visits are made before the end of the isolation period.

The practices of the cities in this respect vary widely as can be seen from the following remarks:

Chicago: (a) If there are no susceptibles in the home, a call is made in 5 days after appearance of the eruption, and if patient is recovered, the warning placard is removed. If the patient is a school pupil, school attendance is then permitted. If the patient is not fully recovered, the placard remains up and a visit is made 3 days later.

(b) If there are susceptible contacts also in the home under quarantine for measles, the calls under (a) are made and the patient released and given a school permit if of school age, but placards stay up for susceptible contacts and an assignment is given for another visit to contacts on the 14th day from the date of the onset of the original case. If the isolated susceptible contacts have developed symptoms of the disease, the new cases of measles in the family are reported and isolation for those continued for 5 days from the date of the eruption. Then a visit is made to terminate isolation, if the patient is recovered and no additional new case has developed in the meantime. Where there is any question about the susceptible contact in the home having measles, the medical health officer is sent.

(c) If any complaint is received from a neighbor that the susceptible contacts are not confined to their own premises during quarantine the health officer is sent. If quarantine and isolation are not observed, the family is warned that any future violations will mean hospitalization for the patient and a session before the Hearing Board for the parent who is responsible.

Boston: Inspection visits every 4 days. One follow-up visit 10 days from date of first reported case in family.

Baltimore: Cases of children over 3 years of age not followed during period of isolation unless very sick, and without medical attendance, and the patient possibly needing hospital care.

Milwaukee: Visits are made at beginning, middle, and end of isolation period.

Racine: Case followed up routinely during period of isolation, but nurses' calls are made when requested by the physician or the family. Hence all reported cases are not visited by the nurse.

New Haven: Cases where a physician is in attendance are not followed during isolation period. Cases taken over by bureau personnel, when no physician is in attendance, if of preschool age, are seen as frequently as twice a day where pneumonia is present, by the bureau physician. In the ordinary case the nurse uses her judgment as to whether it be once a day or every other day in the first few days—the aim being to be sure that the younger cases are in bed for at least 1 week, indoors for another ½ week, and to anticipate possible complications, particularly ear and pneumonia.

Pittsburgh: Visits are made at time of placarding, and of release, and 1 additional visit during quarantine period to see that isolation is maintained, and to give and repeat health instructions. If measles case desquamates, physician releases.

Cleveland: Calls during period of isolation made on date of report and on date of release from isolation. Two to 3 visits are made during quarantine. Two post-quarantine visits.

In only 10 cities is any record kept of the number of physicians' visits made to measles cases in the year, while 16 cities keep records of visits made by

TABLE IV

Visits Made to Measles Patients and Cases Reported During the Year 1933

City	*By Physicians*	*By Nurses*	*By Sanitary Inspectors*	*By Others*	*Cases Reported*
Albuquerque	....	68	....	..	34
Birmingham	....	7	....	..	45
Boston	....	15,900	....	..	5,333
Buffalo	3	....	....	..	1,874
Charleston	....	6	....	..	4
Cleveland	51	248	....	..	102
Detroit	1,630	26,195	....	..	9,050
East Orange	....	2,841	....	..	1,263
Madison	....	3,578	....	..	1,707
Milwaukee	5	60	276	..	140
Minneapolis	....	7,897	....	..	7,897
Newark	....	....	14,796	..	7,398
New Haven	34	....	....	..	87
New York	13,430	90	....	..	36,216
Philadelphia	7,369	....	....	..	7,369
Pittsburgh	127	352	....	..	170
Providence	....	217	....	..	25
Racine	....	5,606 (1932)	....	..	2,649
Rochester	75	100	50	..	50
San Francisco	92	156	227	38	135
Syracuse	25	42	....	..	28
Los Angeles County	1,154	3,585	....	..	8,708
	23,995	66,940	15,349	38	90,284

nurses, and 4 report the number made by sanitary inspectors. The extent of visiting in the 22 cities keeping record of this activity is shown for the year 1933 in Table IV.

The following notes supplement the tabular information:

Baltimore: We have no data indicating the number of calls to measles patients, but a conservative estimate can be made by assuming that 2 visits are made to each of the cases reported. These visits were never made by sanitary inspectors. From 1920 to the end of 1931, all of these visits were made by public health nurses. Since 1931 a part of the visits were made by health department physicians where the original reports of the cases are not received from physicians in practice.

Los Angeles County: No dependable records prior to 1928. The figures here are probably incomplete and do not represent quite all the work that was done.

Chicago: In 1933, 8,463 cases of measles were reported. Two calls are made on every case if no susceptible contacts. If there are susceptible contacts in the family, then there are always 3 calls made on each case. We know that there were 5,896 susceptibles exposed to the 8,463 cases of measles in 1933. We know that 1,375 cases were placarded on the 4th day of eruption, 1,091 on the 5th day of eruption, and 1,352 were placarded for cases over 5 days after eruption appeared. None of this combined total of 4,818 cases of measles would have been placarded had there been no susceptible contacts in the family. Therefore, 3 calls were certainly made on this group of 4,818 cases. There is no way of estimating how many of the remaining 3,645 cases had 3 calls, and how many with no susceptibles had only 2 calls made. What is true for the cases in 1933 is approximately true for cases occurring in the other years listed. The average number of calls made during any given year were made in the ratio of 4/9 by nurses and about 5/10 by health inspectors.

Kansas City: We have only one quarantine officer, which makes it impossible to make more than 1 call on each case.

V. *Post-Release Visits* — Visits are made to the patient's home after release of the case from isolation in 6 cities, while in 24 cities no such visit is made. The interval at which the subsequent visit is made after termination of isolation is variously described:

Berkeley: when necessary

Boston: 1 visit 10 days after first reported case in family

Buffalo: within 2 days
Cleveland: once a week for 2 weeks
New Haven: until ready for return to school, or convalescent and free from complications
San Francisco: before return to school or classroom.

VI. *Placarding of Premises*—Placarding is carried out in 16 cities and is not in 15.

Albuquerque: Placarding is used only when there is no epidemic of measles.
Chicago: Placard remains posted until the period of incubation is past for susceptibles in home, but the original case may return to school 5 days after appearance of rash.
Detroit: Uses warning signs.
New Haven: Placarding only when there are susceptibles in the household.
Portland: White flag used as warning.
Racine: We are required to placard by law, and do not believe that it interferes with reporting. The public here expect the placard, and families know that the nurses will find them sooner or later, so reporting is reasonably complete.

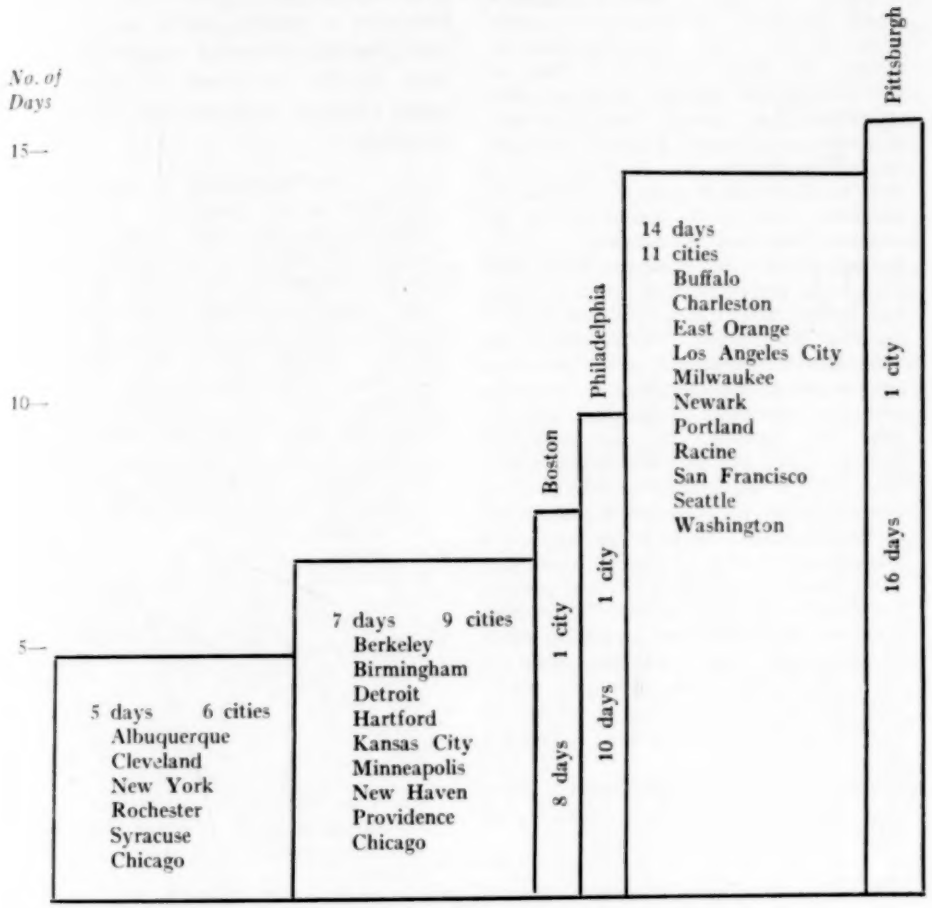
VII. *Isolation of Patient*—Nine cities report absolute isolation, 20 a modified isolation, and 1, Austin, Tex., no isolation requirement.

The following comments elucidate some of the variety of isolation practices followed, as required by state or local regulations.

Albuquerque: Isolation of the infected person from onset until 5 days after the date of eruption.
Chicago: Case shall be quarantined from onset of disease until 7 days after the appearance of the rash and thereafter until the catarrhal symptoms and abnormal secretions of the mucous membrane have ceased, where there are non-immunes in the home; otherwise the quarantine shall be for 5 days.
Cleveland: The quarantine shall in case of measles be established on the date of report and shall continue 5 days after the appearance of the eruption.
Hartford: Patient isolated by exclusion from school.
Kansas City, Kans.: Quarantine minimum, 7 days after appearance of rash and until discharges from nose, ears, and throat have disappeared and until cough has ceased. Strict isolation of patient.
Los Angeles: Minimum period of isolation shall be from 4 days before, until 7 days after the appearance of the rash.
Los Angeles County: It shall be the duty of the local health officer to see that cases of measles are properly isolated, and to define the area within which the patient and his immediate attendants are to be isolated. Without permit from the local health officer no person shall carry, remove, or cause to be carried or removed from any hotel, boarding house, lodging house, or dwelling, any person affected with measles. Isolation in this disease is defined as that degree of detention necessary to insure non-contact with susceptible persons.
Madison: Isolation for patient. Adults and children known to have had measles, not quarantined.
Milwaukee: Conspicuous placard on house and isolation of patient for 14 days from the time the case is reported to the local health officer, is required by state law.
Minneapolis: Release from isolation not sooner than 7 days from the first day of sickness and after coryza has subsided.
New York: Case is isolated for 5 days after the appearance of the rash, provided there are no abnormal mucous membrane discharges.
Pittsburgh: The quarantine for . . . measles shall be 16 days. It may be reduced to a minimum of 10 days when the person suffering from the disease is the only susceptible in the household, and the attending physician has certified to the health officer that clinical recovery is complete. In addition to enforcing the mandatory regulations as required by state law, the local health department requires the field nurses to visit each home to give health instructions, to exclude susceptibles from school, and to see that isolation is properly maintained.
Portland: Contacts must remain out the same length of time as patient, unless they have had measles.
Providence: The patient should be isolated in a room by himself to protect him, so far as possible, from secondary infection which so often is responsible for secondary bronchopneumonia. Isolation will not protect the family or community because the patient is infectious 3 to 5 days before a diagnosis is usually made. For this reason placarding the home is not required.
Rochester: Until recovery—5 days after ap-

MEASLES

The minimum duration of isolation as required or customary may be expressed as follows



N.B.: Austin none. 1 city, Baltimore, until recovery

pearance of rash. There must be no discharging ear.

Seattle: Strict isolation for at least 7 days after appearance of skin lesions, extended when necessary to await cessation of all eye, ear, nose, and throat and gland discharges, and until skin lesions are entirely cleared up.

Washington: Excluded from school; not permitted on public street or in place of public assemblage, or in public conveyance.

Release from isolation is authorized through the family physician in 5 cities, by the health officer in 22 cities, by the school physician in 2 cities, and in conjunction with the health officer in 6 other cities, in 1 city by the sanitary inspector or a nurse, and in 1 city by parents or the school physician.

Several special comments follow:

Austin: Authority for release must pertain to authority to return to school, since isolation is not required.

Buffalo: Reports from private physicians are accepted, *prima facie,* for removal of quarantine.

Los Angeles County: The release comes in the form of a permit to return to school.

Minneapolis: Release from isolation at expiration of time limit. Release is automatic; requires no special authorization.

New York: Release from isolation by the attending physician, medical inspector, school physician, or department nurse, using certificate that case has been examined and found to be free from any infectious disease, and may return to school on specified date. Measles contacts in wards of general or children's hospitals are quarantined for measles. (a) A contact patient may be discharged if there is a health department record of the contact having had measles. This may be obtained from the Borough Chief of the Bureau of Preventable Diseases in the Borough in which the contact resides, who will issue a certificate if the case is on record. (b) A contact patient may be discharged if the physician who attended the case filed a certificate with the department to the effect that the child had measles. In such cases the Borough Chief will issue the necessary permit. (c) If the contact patient receives immune serum, or whole blood, and all the children contacts (between the ages of 6 months and 15 years of age) at home have been immunized (hospital to have positive knowledge of the immunization). (d) New cases may be admitted to quarantine wards provided they receive immune serum or whole blood prior to admission, or a certificate from the Borough Chief of the Bureau of Preventable Diseases showing a previous attack of measles.

Rochester: If there is no attending physician, then health officer, school physician, or nurse may release from isolation.

VIII. *Quarantine of Contacts*—In 12 cities quarantine of some members of the household is required, while in 15 cities it is not. In 11 of the 12 cities requiring quarantine it applies only to children of school age or under; where not specifically required it is applied to presumed, or precisely known susceptibles, especially among minors. In 1 city the entire household is quarantined, children and adults, and in another city the susceptibles regardless of age. Changes in procedure in recent years (1924–1933) have been rare, but the following instances are noted. Placarding was discontinued in Buffalo in 1929, in Syracuse in 1932, and in Providence in 1934. In Baltimore, contacts have been allowed, since 1931, to go to school, subject to daily inspection there by a public health nurse. Detroit recently released susceptible contacts in the 7th grade of school and over, 14 days from contact, instead of 21 days.

Buffalo: The quarantine, as regards other members of the household, depends entirely on the individual family; in cases where the contacts of adults are likely to involve children, as in families of teachers and similar occupational groups, the quarantine is made more rigid than with others.

Chicago: During a part of the earlier period of years under consideration, the non-immune contact went to school for 10 days from the date of the first exposure. At present, as well as during most of the 10 year period, all susceptible contacts to measles are excluded from school and kept on the home premises.

East Orange: Children or school teacher contacts who have never had the disease are excluded from school for 2 weeks.

New York: Contacts are excluded from school or work for 14 days after exposure, whether they remain at home or change their address to a home where there are no children, or the case is removed to a hospital or dies. Those who have had the disease may be permitted to return to school or work after certification by the department of health provided they remove to another address where there are no other children.

Revised Section 89 of the Sanitary code (1935) reads as follows: "'contacts' as herein specified, means school teachers, school children, clerks, custodians, day nursery attendants, librarians, and food handlers."

IX. *Hospitalization* — Hospitalization of measles patients is required by the department of health in 11 cities, when the home living conditions are insanitary, and in 9 of these also when the patient is reported in a boarding house, and in 3 other cities only when the patient is in a boarding house. In 13 cities there is no requirement for removal of a measles patient to a hospital.

Hospitalization of patients is definitely encouraged in 7 cities, in 4 of which this applies only to children under 5 years of age, and in 2 others to minors of any age, and in 1 city to adults as well. In 20 cities it is not encouraged.

The following notes express differences in points of view and apparent objective in hospitalization.

Baltimore: Hospitalization is practically never "required." Hospitalization is a service rendered as available and as needed in hope of saving lives. During measles outbreaks, hospital beds are at a premium. Eighteen thousand reported cases in about 5 months in the last outbreak. Impractical to encourage hospital care. Try to encourage good medical care and home nursing.

Charleston: Where there are many contacts and no one available for the care of the patient, or who is willing to accept isolation responsibilities.

East Orange: For patients from institutions; for families which cannot afford a doctor.

Los Angeles County: Encouragement of hospitalization decided not by age, but by severity of disease, sanitary conditions of home, whether or not the case is in a boarding house, etc.

New York: Authority to remove to hospital if circumstances are such as to create hazard to the lives or health of other persons.

Racine: During outbreak of 1932 "home care was stressed. No cases were hospitalized."

San Francisco: Hospitalization required and encouraged when it appears justifiable in the eyes of health department attache for reasons mentioned.

Syracuse: Since the opening of our new Communicable Disease Hospital in 1929, we have encouraged admission of measles cases, especially in the younger age groups. Obviously cases with complications have to be admitted whenever required.

The extent of hospitalization of measles in those cities for which records are available throughout the 10 years can be read from Table V.

Summarizing the above experience in relation to population, and incidence of measles, we find that for the total cumulated population of those cities reporting the number of measles patients hospitalized each year, on an annual basis for the 10 years, there were 18.2 cases of measles hospitalized per 100,000 of the population, or that 4.1 per cent of the total cases (581,354) of measles reported in these cities in these years were hospitalized, ranging from 0.2 per cent in Seattle to 11.1 per cent in Charleston.

X. *Immunization*—Passive immuniza-

TABLE V

Numbers of Measles Patients Known to Have Been Hospitalized in Fourteen Cities, 1924–1933

City	*1924*	*1925*	*1926*	*1927*	*1928*	*1929*	*1930*	*1931*	*1932*	*1933*	*1924–33*
Baltimore	22	38	262	29	184	5	9	228	1	6	784
Charleston	20	1	2	11	3	1	0	90	0	1	129
East Orange	2	3	32	4	25	0	13	3	2	29	113
Madison	3	4	56	15	4	13	22	1	1	16	135
Milwaukee	10	19	86	43	17	77	10	95	71	2	430
Minneapolis	73	20	218	25	23	167	62	83	7	93	771
New York	1,395	843	1,984	285	2,515	325	2,542	2,141	1,390	3,859	17,279
Philadelphia	112	127	337	28	344	31	207	290	22	170	1,668
Pittsburgh	13	36	6	19	52	51	80	60	43	30	390
Providence	6	72	250	10	256	136	15	140	158	1	1,044
Rochester	31	65	50	20	60	51	31	52	90	3	453
San Francisco	15	9	85	75	10	78	137	34	55	12	510
Seattle	24	2	2	7	2	3	4	1	0	0	45
Washington	29	35	75	8	106	35	61	139	26	77	591
Total	1,755	1,274	3,445	579	3,601	973	3,195	3,357	1,866	4,299	24,342

tion against measles is recommended in 15 cities and it is not in 16 other cities.

In 14 cities it is advised for children under 5 years or under 3 years of age, and in 6 of these cities for older children also. It is assumed, and in several instances declared specifically that the immunization is intended only for known susceptible exposed children.

Convalescent serum or whole blood is provided by or through the department of health in 5 cities, and in 3 of those at no cost. In 1 city, the immune serum or blood is available free to all persons, and in 1 city is provided free to contacts under 3 years of age who are in special need and unable to pay for it. In 1 city, the immune serum or blood is provided free to children under 5 years of age, to the aged, to cardiacs, to maternity patients, and in institutional outbreaks.

In 8 cities passive immunization is by the use of parent whole blood direct, and in 3 of these cities, citrated whole parent blood and convalescent serum are also used. In 1 city citrated whole parent blood is used. In 2 of the cities using whole parent blood direct, convalescent serum is also used. In 3 cities only convalescent serum is used.

Apparently immunizing blood and serum were first used among these cities by Providence in 1918,* by New York and Syracuse in 1923, by Baltimore in 1926, in Detroit in 1928, in Buffalo in 1929, in Madison in 1930, in Boston in 1933.

The therapeutic use of serum or blood is encouraged by the health department in 14 cities and is not in 12 cities.

Notes from several cities give further details as follows:

Baltimore: Therapeutic use of immunizing serum or blood is encouraged by the department of health for those needing it, but very quietly. Convalescent serum is ordinarily impossible to secure in sufficient quantities; hence, it is a mistake to stimulate a demand impossible to satisfy.

Buffalo: Serum or blood is provided for free or paid use, on special request from the state department of health.

Chicago: Passive immunization is recommended for susceptible children contacts under 3 years of age and for susceptible aged adults if frail.

Detroit: Blood serum from persons who have recovered from cases of measles (many donors have had measles several years previously) is available free for contacts to cases of measles under 5 years of age, and in addition it is available to the aged, those affected with heart disease, women who will shortly be confined, and for all contacts who have not had measles in institutional outbreaks. We are particularly anxious to use the serum on contacts under 2 years of age. It is aimed to give the serum on the 5th to the 7th day after exposure in order that they may develop the disease in a mild uncomplicated form. A study of 150 such immunized children who have passed through 2 years in which measles was unusually prevalent shows that only 2 developed measles and these 2 were in a single family which is exceptionally susceptible to measles. Both of these children have had measles several times. This family is that of one of our best physicians in Detroit and these children have been diagnosed each time by one or more of our best pediatricians, so that we do not feel that there has been a mistake in diagnosis on previous occasions. Our fatality rate per 100,000 population has decreased more rapidly since we began to use convalescent serum in 1928.

Providence: Convalescent serum is supplied to physicians treating people unable to pay, by the health department through the Charles V. Chapin Hospital. This is, however, limited to children under 3 years of age. Any person able to pay for the services of a physician is expected to pay for the convalescent serum. Where convalescent serum is not available, whole blood of the parent direct is recommended, and this is used to a great extent by many of the pediatricians in their private practice. We have no definite figures on this procedure.

Racine: During the outbreak in 1932 when instructive pamphlets had been issued by the department of health, physicians reported that they were called to see more

* Use of serum confined to old City Hospital in 1918, furnished for general use in late 1926, made generally available in 1928 for use in children under 3 years of age.

cases of measles than in any other outbreak. Practically no serum or parental blood was given. Therapeutic use of immunizing serum or blood is not encouraged by the department of health "but is recommended whenever an opinion is asked, carefully explaining that results cannot be expected in more than half the cases."

Rochester: Because of the short immunity rendered by blood, we have not deemed its use a sound public health measure. Many of our pediatricians are using whole or citrated blood, and we have on hand citrate in small packages for use in such procedures. The value of whole blood for therapeutic use has not been sufficiently demonstrated to warrant its recommendation as a public health measure.

XI. *Visiting Nursing*—Visiting nurses are allowed to give bedside nursing care to measles in 28 cities, but are not allowed to in Cleveland. In 21 of the 28 cities, bedside care by the visiting nurses is encouraged by the department of health, but is not in 6 of these cities. The extent of visiting nurse care of measles patients in their homes for those cities able to supply the record through the nursing agency for the 10 years, can be read from Table VI showing visits made to patients for bedside care.

There were only 6 cities for which records of the nursing visits made each year to measles patients were available for the entire 10 year period. In these cities there were reported a total of 37,540 nurse visits for bedside care to measles patients, and 413,428 cases of measles, or 1 visit for each 11 measles patients reported. There is no record of the number of measles patients actually served by these 37,540 visits. Some measles patients were visited but once by a nurse for bedside care, others were visited on more than one occasion during the course of the disease.

XII. *Institutional Practice*—In 13 of the cities an observation period is required on admission of children as inmates of institutions for domiciliary care, and in 14 cities such is not required. In 2 cities the observation period required is 1 week; in 9 cities 2 weeks, in 1 city 3 weeks.

Immunization of child contacts on appearance of measles in an institution is required in 5 cities, but is not in 23 cities. In the 5 cities where it is required convalescent serum is used.

Variations in the practice for control of measles in institutions for children appear in notes for several cities.

Baltimore: The length of observation period varies usually from 3 to 4 weeks, depending upon circumstances. No admissions are made during city-wide measles outbreaks. There are only 3 institutions in the city which give domiciliary care for more than 50 preschool children at a time.

Although immunization of child contacts in institutions where there is measles is not

TABLE VI

Number of Visits for Bedside Care Known to Have Been Made to Measles Patients at Their Homes by Visiting Nurses in Six Cities, 1924–1933

	1924	*1925*	*1926*	*1927*	*1928*	*1929*	*1930*	*1931*	*1932*	*1933*	*1924–33*
Detroit	96	44	460	55	833	162	860	84	702	592	3,888
East Orange	0	7	118	14	161	12	207	7	71	549	1,146
New York	2,657	737	4,344	247	3,247	334	2,662	3,045	1,490	6,944	25,707
Philadelphia	164	246	547	37	725	45	220	799	10	470	3,263
Providence	3	0	225	1	212	98	34	250	580	4	1,407
Washington	18	78	496	22	348	87	168	705	52	155	2,129
Total	2,938	1,112	6,190	376	5,526	738	4,151	4,890	2,905	8,714	37,540

required, such immunization with convalescent serum is carried out for these children on a voluntary basis of coöperation and approval, and the health department recommends this for children under 3 years of age, or others listed as poor measles "risks."

Charleston: Immunization of child contacts is required at a day nursery. Serum from parents' blood or serum from blood of recovered cases of positive measles is used.

New Haven: All children in institutions, immunes included, are examined for nasal and aural discharges.

New York: Immunization of contacts is a local matter to be decided by the attending physician and institution officials.

Providence: Isolation of contacts for 21 days. Convalescent serum advised, if available, for children under 5 years of age.

IV

Administrative Procedures and Policies in Effect for the Control of Whooping Cough Among the Thirty-two Cities

I. *Reporting*—Among the 32 cities replying, the reporting of cases of whooping cough is required by the department of health in 30, and in 2 (Austin and Washington) it is not. Twenty-three cities accept report by mail, and 21 by telephone. Twenty-seven require report on the day of diagnosis or within 24 hours, and 1 on the weekly report card.

Estimates of the percentage of cases actually occurring which were reported to the department of health vary widely:

Less than 30% in 3 cities
Between 30% and 50% in 7 cities
Between 50% and 70% in 3 cities
Between 70% and 90% in 4 cities
Between 90% and 100% in 7 cities

Notes upon the percentage of reporting supplement the numerical estimates:

Baltimore: Tables of incidence and deaths suggest very good reporting.

Berkeley: Ninety to 95 per cent of diagnosed cases are reported.

Birmingham: Probably 68 per cent of cases are reported based on 25 cases per death during the past 3 years.

New Haven: Although one-half or more of the cases may be found by bureau personnel, we doubt that total recorded is much in excess of 50 per cent in years of prevalence.

Kansas City: During school term most of school cases are reported; probably half of the preschool cases.

Racine: Nurses say 100 per cent of cases are reported, and they claim to know all the children. In the past 8 years, 3,476 cases were reported; 9,000 births were reported. U. S. Public Health Service estimate 70 per cent of children get whooping cough, or 6,300. We estimate we get reports of 50 per cent to 60 per cent of cases.

Syracuse: The extent of reporting is checked by house-to-house canvass for sampling to compare with reports. Reporting has increased from 25 per cent to about 75 per cent of completeness in past 10 years, based on such canvassing.

The ratio of reported cases of whooping cough under 5 years of age to live births in the decennium 1924–1933 for 17 cities * which tabulated cases for that age group for the 10 years consecutively was 5.5 per cent.

The ratio of all reported cases of whooping cough to live births for the decennium 1924–1933 and the included quinquennia so far as reports of cases are available for the 31 cities were as follows:

1924–33	9.4%
1924–28	7.9%
1929–33	11.1%

II. *Verification of Diagnosis*—The diagnosis of whooping cough is verified by a physician of the department of health in 7 cities. In 10 cities a physi-

* Albuquerque, Baltimore, Berkeley, Birmingham, Boston, Chicago, Detroit, East Orange, Hartford, Los Angeles County, Minneapolis, Newark, New Haven, Pittsburgh, Rochester, San Francisco, Syracuse.

cian of the department establishes the diagnosis if uncertainty exists, as when a case is reported by someone other than a physician, *e.g.*, nurse or parent, or when the attending physician requests it. In 17 cities no diagnostic service is provided.

In Madison the plate culture method has been used for release of whooping cough patients from isolation, but the method is not considered successful in practice. The plate culture method has been used occasionally as an aid in diagnosis in Milwaukee and Syracuse.

III. *Visits of Investigation and Instruction*—Visits of instruction are made to whooping cough cases in 27 of the cities, and such visits are not made in 4. In 1 city a physician calls to advise in exceptional cases. In 23 cities regularly providing instruction this is given by nurses; in 2 others by a physician as an alternate. In 3 cities the visits are made by a physician only. In 5 cities the sanitary inspector shares in this work. Such instruction is given on the day of report in the case of 20 cities, and at a later date in 7. In the case of Cleveland, Madison, and Syracuse, visits are made on the day of the report and at a later date as well.

IV. *Visits during Isolation*—Calls are made during the period of isolation in 16 cities and are not made in 12 cities.

The number of visits made to a case of whooping cough varies from 1 to 6, in 2 cities 1 visit, in 10 cities 2 visits, in 5 cities 3 visits, in 3 cities 4 visits. Supplementary information is offered in the notes below:

Baltimore: Visit of instruction and education is made by a nurse, if the case was reported by a physician; visit made by physician if case was reported as suspected whooping cough. Calls are not made during the period of isolation unless the patient is very sick and there is no doctor in attendance, and the patient may need hospital care.

Berkeley: Calls during period of isolation are made when necessary.

Birmingham: Cases are not followed up routinely during the period of isolation, but nurses' calls are made when requested by the physician or family. Hence, all reported cases are not visited by the nurse.

Buffalo: Follow-up and visits are ordinarily made by the physician to attendance. Physicians and nurses from the department are called in only to confirm diagnosis, and in cases where no private physician is in attendance.

Cleveland: Once a week for a period of isolation unless condition or circumstances warrant additional calls.

Detroit: Calls are made for period of isolation; except that more frequent calls are made where occasion demands it.

Los Angeles: Letter of instruction is sent to all cases reported. When instructions are not followed, quarantine is established. One visit is always made to each case, sometimes more.

Los Angeles County: Average less than 1 per patient.

Milwaukee: Calls during period of isolation are made as follows: 1 at the beginning, 1 at the end of isolation period, and an average of at least 1 call in between.

New Haven: If a physician is in attendance, the case may be checked every few days depending on apparent willingness or otherwise of parent to coöperate. If no physician is in attendance and parents are unwilling to have vaccine treatments, the case is followed at least twice weekly for observation and for the possibility that the parents may change their minds and have vaccine.

Pittsburgh: Visits are made during the period of isolation from the time of report or discovery to about the 6th week from onset.

Syracuse: Calls are made during the period of isolation from time of report or discovery to about the 6th week from onset.

Calls of representatives of department of health on whooping cough patients so far as these are recorded by the 21 cities are shown in Table VII for the year 1933.

Notes illustrating variations in procedure follow:

Albuquerque: Calls are made by a nurse and sanitary inspector. These are not recorded separately.

Baltimore: We have no data indicating the number of calls to whooping cough patients, but a conservative estimate can be made

TABLE VII

	Physician	*Nurse*	*Sanitary Inspector*	*Other*	*Cases Reported*
Albuquerque	....	440	....	....	220
Boston	....	7,838	....	....	2,611
Buffalo	27	196	....	....	1,708
Charleston	....	38	....	....	150
Cleveland	978	5,987	....	....	2,017
Detroit	1,360	14,805	....	....	4,986
East Orange	....	780	....	....	289
Los Angeles County	108	1,342	....	....	2,264
Madison	....	890	....	....	424
Milwaukee	9	....	....	....	3,487
Minneapolis	....	768	....	....	768
Newark	....	....	6,040	....	1,510
New Haven	256	....	....	....	389
New York	....	50	....	....	6,009
Philadelphia	750	....	....	....	750
Pittsburgh	969	4,159	....	....	2,078
Providence	....	1,915	....	....	1,188
Racine	....	....	....	....	671
Rochester	1,494	996	510	....	498
San Francisco	566	650	1,219	375	2,098
Syracuse	27	2,817	....	....	805
					34,920

by assuming that 2 visits are made to each of the cases reported on the earlier table. These visits were never made by sanitary inspectors. From 1920 to the end of 1931 a part of the visits have been made by Health Department Physicians, where the original reports of the cases are not received from the physician in attendance.

Chicago: Data regarding calls made by physician not segregated by disease. For each year during the period 1924–1933, about 50 per cent of the calls were made by a nurse and about 50 per cent by a sanitary inspector. About 2¼ calls per case each year.

Kansas City: We have only one quarantine officer, which makes it impossible to make more than 1 visit to each case.

New York: Visits are not made as a routine, but to check absentees from school.

Seattle: No record. Very few such calls are made. A health department physician sees such a case only rarely and by special arrangement.

Syracuse: No record has been kept of nurses' visits for whooping cough, but checking for specified periods of time showed an average of 3½ visits per case. The data for nurses' visits have been thus derived.

V. *Post-Release Visits*—In 5 cities a call is made after release of a whooping cough patient from isolation, but no such call is made in 25 cities.

The interval after release at which these subsequent visits are made is in 2 cities once a week for 2 weeks, in 2 after a 7 day interval, in 1 only as a check on school attendance.

VI. *Placarding of Premises*—Placarding of premises in whooping cough cases is a routine in 15 cities, and is not carried out in 17 cities. In 1 city placarding is omitted during epidemics of whooping cough, in another it is used only when instructions are not followed for isolation.

VII. *Isolation of Patients*—Absolute isolation is required in 3 cities, no isolation in 3 cities, and modified isolation is required in 26 cities.

The period of isolation varies within rather wide limits, from 2 weeks after onset of the whoop, up to 6 weeks, or until recovery, but not longer than 8 weeks.

There are 5 cities which require 2 weeks' isolation, dating from the onset

of the whoop; 6 cities require 3 weeks; 9 require 4 weeks; 2 cities require 5 weeks; 6 cities require 6 weeks.

The following statements from several cities disclose the variations in principles and practices of isolation:

Albuquerque: Isolation is required of the infected person from children and exclusion from school and other public places, from commencement of symptoms, and for at least 4 weeks after the commencement of the spasmodic stage.

Chicago: Prior to October, 1928, 4 weeks' isolation from onset of the paroxysmal cough was required. From October, 1928, to September, 1932, a 3 week isolation period was in effect. From October, 1932, to April, 1935, the following procedure was required:

"Whooping cough cases will be confined on placarded premises until 2 weeks after appearance of paroxysmal cough. At the end of this 2 weeks' period, the house quarantine shall be terminated, the placard removed, and the house quarantine shall be replaced by an armband (modified isolation), which latter shall continue for a minimum period of 2 weeks. During the period of armband isolation, the child shall constantly wear an armband uncovered and exposed at all times. During the period of this isolation the child shall remain on the premises, and shall not come in contact with other children. However, daily airing in an automobile may be allowed provided precautions are taken to see that the child does not come in contact with other children. If the child who has whooping cough violates the provisions of this rule by coming in contact with other children, the quarantine shall be changed from modified to unmodified quarantine, and the house or apartment shall be placarded, and the child not be permitted outside the dwelling until the termination of quarantine. It shall be the duty of all health authorities to see that the provisions of the above rules are complied with."

Cleveland: The quarantine provided by this chapter shall in the case of whooping cough be established on the date of the report and shall continue 2 weeks after the development of the characteristic whoop. (After the first week of quarantine any child having whooping cough may go upon the public thoroughfare provided he wears a yellow armband upon the arm on the outside of the clothing, having the word "whooping cough" in black letters not less than 1 inch high). Note: The armband is never used in Cleveland.

Kansas City: No person, except those who have previously had disease, exposed to whooping cough, shall be permitted to attend school or places of public assemblage for 14 days after exposure. Quarantine minimum 42 days, or until 1 week after the last paroxysmal cough or whoop. Strict isolation of patient is required.

Los Angeles: Patients with whooping cough must not be permitted to come in contact with those who have not had the disease. Patients must not enter any school, church, theater, or any other public buildings, or ride in any public conveyance. Children afflicted with whooping cough must not leave the premises except when accompanied by an adult, whose duty it is to see that the child does not expose other children. The patient may return to school when completely recovered. School readmittance cards must be obtained from the health department. The patient is isolated for 3 weeks with that degree of detention necessary to assure non-contact with susceptible persons. Adult members of the household are not subject to restriction.

Los Angeles County: Applicable only to children of school age. No definite period. The health officer must issue a certificate at the health center before the child can return to school.

Milwaukee: The placard may be removed in 4 weeks from date of report to local health officer, provided such period is not less than 6 weeks from beginning of catarrhal symptoms.

Minneapolis: Modified quarantine is released under the following regulations: Not sooner than 21 days from the first date of the characteristic whoop, although cough may still persist.

New York: A whooping cough case is isolated until 2 weeks after the appearance of the whoop and may return to school after the whoop has disappeared. Contacts of cases of whooping cough are not excluded from school or work.

Philadelphia: Patient may be taken on the highways in the custody of a competent person after 21 days of quarantine, by permission of the department of health.

Pittsburgh: The quarantine period for whooping cough shall be a minimum of 4 weeks from date of onset provided that after the 3rd week, and with the permission of the health authorities, the pa-

tient may be taken on the streets or highways by a competent person whose responsibility it shall be to prevent contact with individuals other than those of the immediate household. In addition to enforcing the mandatory regulations as required by the state law, the local health department requires the field nurses to visit each home to give health instructions, to exclude susceptibles from school, and to see that isolation is properly maintained.

Portland: The patient is isolated for 21 days after the development of the cough, and contacts for 14 days after last exposure to the patient.

Providence: Isolation should be maintained for 3 weeks from recognition of symptoms, that is, after the whoop develops. The patient must not return to school for at least 3 weeks from the time when the whoop develops.

Racine: Four weeks from date of report to local health officer, and not less than 6 weeks from beginning of catarrhal symptoms.

Rochester: Until 6 weeks after the development of the disease, or until 1 week after the last characteristic cough. The patient only is isolated.

Seattle: The period of isolation should not be less than 5 weeks, and longer if necessary until the disappearance of the characteristic whoop.

Syracuse: Until characteristic coughing has ceased, and for 1 week thereafter—maximum 8 weeks.

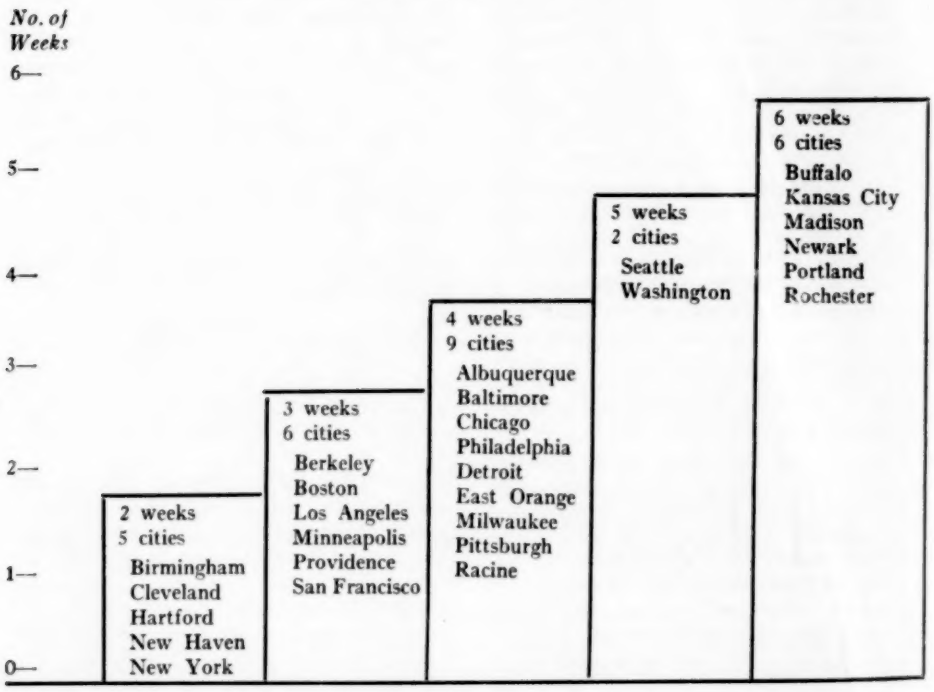
Washington: Thirty-five day exclusion from school. Not permitted on street unless accompanied by an adult over 18 years old.

Release from isolation is by authority of the family physician in 3 cities, by the health officer in 22 cities, by the school physician in 1 city, equally by health officer or school physician in 2 others, by the nurse in 4 cities, and equally by the health officer or the nurse in 2 others. The health inspector

WHOOPING COUGH

The minimum duration of isolation as required or customary may be expressed as follows

(Twenty-eight Cities)



releases in 1 city, and the duty is put upon the parents in 1 city.

A warning armband is required in 3 cities, for freedom of the street, after a certain period of house or room isolation. No armband regulation is in effect in 27 cities.

Reduction of the period of isolation has been authorized in 6 cities during the past 10 years, and armband regulations were discontinued in 2 cities.

VIII. *Quarantine of Contacts*—Quarantine is required for members of the household in 11 cities, but is not in 18. Quarantine is intended to be selective and applicable only to susceptibles, or to minors, or to adults such as teachers likely to be in contact with children elsewhere, in the cities where it is required. The following notes indicate the policies of several cities.

Baltimore: Since 1931 contacts have been allowed to attend school, subject to daily inspection there by health department public health nurse.

Buffalo: The quarantine, as regards other members of the household, depends entirely on the individual family; in cases where the contacts of the adults are likely to involve children, as in families of teachers and similar occupational groups, the quarantine is more rigid than with others.

Detroit: Susceptible contacts below 7th grade in school are quarantined 1 month.

Racine: Well children in the family may attend school. Children exposed to whooping cough, whether residing within or without the patient's home, who develop coughs and colds, must be kept in isolation upon the premises pending diagnosis of whooping cough, or recovery.

IX. *Hospitalization*—Hospitalization is required for a patient with whooping cough when home conditions are insanitary, by 5 cities, and when the patient is in a boarding house, by these 5 and 6 more cities (11 in all), and is required under no conditions by 17 cities.

Hospitalization is encouraged in 9 cities, but is not in 20 cities except for complicated cases and occasionally for infants.

Encouragement of hospitalization is limited almost entirely to children under 5 years of age, but is occasionally found desirable in 2 cities for older children also.

The following notes illustrate the attitude of the health departments of several cities:

Baltimore: Hospitalization is practically never "required." Hospitalization is a service rendered when circumstances make it desirable, especially where the illness of the patient is severe, and on request or consent of the family or physician.

Chicago: Hospitalization is required if isolation is not observed, and for all whooping cough cases under 1 year of age who have not good medical and nursing care at home. If parents are employed and there is no one to take care of the child at home hospitalization is also required; because of lack of hospital space hospitalization is not encouraged, except for the cases enumerated above and for patients reported in a boarding house or orphanage.

Detroit: Hospitalization is required where modified isolation cannot be carried out.

East Orange: Hospital care is required when the patient is in an institution, or in a family where medical attention cannot be paid for; and is encouraged only when needed.

Los Angeles County: Encouraged only for severe cases.

Newark: Hospitalization is required for any age of patient in a hotel, boarding house, etc. Encouraged for severe cases, and those with complications.

Syracuse: We have instructed our nurses to endeavor to get every infant with whooping cough into the hospital as early as possible, and not to wait until complications appear. In a study of a small series of infants in the early stages of the disease we have been able to show by X-ray, infiltration in the lungs before any fever or clinical symptoms appeared. We have especially instructed the health department nurses to be on the lookout for new-born babes coming into a home where there is whooping cough. We have offered to take in the new baby directly from the maternity hospital to the communicable disease hospital for protection, or to remove to the hospital older children with the disease.

TABLE VIII

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1924–33
Baltimore	10	40	53	28	88	62	18	119	68	34	520
Berkeley	0	1	0	2	0	3	0	2	0	1	9
Charleston	9	7	2	12	6	14	15	5	1	24	95
Chicago	35	10	85	123	180	68	45	87	90	73	796
East Orange	2	0	1	2	3	5	0	15	5	17	50
Madison	0	3	1	1	0	2	5	2	1	2	17
Milwaukee	24	22	26	18	65	52	41	45	53	37	383
Minneapolis	9	33	41	15	20	54	13	29	15	17	246
New York	670	646	451	742	921	504	704	1,303	967	918	7,826
Philadelphia	103	144	99	86	223	143	63	144	114	23	1,142
Rochester	25	29	43	27	44	68	27	49	15	56	383
San Francisco	0	26	15	40	37	28	15	84	93	21	359
Washington	5	16	5	7	10	4	1	16	15	16	95
Total	892	977	822	1,103	1,597	1,007	947	1,900	1,437	1,239	11,921

The amount of hospitalization in those cities which provide for it and have recorded the number of patients admitted to hospital in each of the 10 years, can be read from Table VIII.

Summarizing the above reported hospitalization of whooping cough patients, in relation to population and incidence of the disease, we find for the total cumulated population on an annual basis for the 10 years in those cities reporting the number of whooping cough patients known to have been hospitalized, there were 7.7 cases of whooping cough hospitalized per 100,000 of the population, or 5.6 per cent of the total cases of whooping cough (406,254) reported in these cities in these 10 years were hospitalized, ranging from 0.2 per cent in Berkeley, to 13.5 per cent in New York.

X. *Immunization*—Active immunization of contacts by whooping cough vaccine is recommended by the department of health in 12 cities, and is not in 15 other cities. Where recommended it is advised for children under 5 years of age in 12 cities, and for older children in 7 of these cities, but in no city is it advised for adults. Vaccine is provided by the department of health in 9 cities but is not in 16 other cities.

Passive immunization is recommended in 3 cities and is not in 25 other cities. Some form of immunization procedure has been introduced in one or more of these cities; since 1915 in Rochester, and as recently as 1934 in Seattle and Charleston. The active immunization appears to be preferred in 9 and the passive in 2 cities. The experience of several cities is sufficiently explained in the following notes:

Baltimore: Whooping cough vaccine is furnished by the health department to physicians desiring to use it.

Charleston: Vaccine is provided by the department of health at cost.

New Haven: Whooping cough vaccine is provided by the department of health for those unable to pay.

New York: The department, through its Bureau of Laboratories, supplies whooping cough vaccine for the immunization of contacts. Owing to the doubt concerning the efficacy of the product, the department assumes a non-committal attitude toward its administration. The vaccine is administered in its clinics upon request but no active propaganda in its favor is conducted. Private patients seeking information of the department as to the efficacy of the vaccine are urged to abide by the decisions of their own physicians.

Philadelphia: Passive immunization by convalescent blood or serum is not recommended at the present time.

Portland: Whooping cough vaccine is not provided by the department of health except for the poor.

Providence: Although this department has not had any active program for immuniza-

tion of whooping cough cases, there has been a clinic for whooping cough at the Charles V. Chapin Hospital. This clinic has been in effect since the summer of 1930. Prior to the establishment of this clinic, cases had been seen in the pediatric clinic. An attempt was made to segregate these cases from other children in the clinic. The regular whooping cough clinic is conducted in the afternoon so that there is less possibility of exposure of susceptible children to active cases of whooping cough. This clinic is primarily one for observation and advice. Vaccine therapy has been used as both a prophylactic and a therapeutic agent. I have no figures at hand to give any definite results, but I personally conducted the clinic for a period of 17 months, and I could not see any appreciable benefit of the vaccine as either a prophylactic or a therapeutic agent. We were using the stock vaccine prepared by the Ely Lilly Laboratory. For the past few months we have used the Sauer's vaccine, but have not had sufficient experience with it to comment on the merits or demerits of the product.

Racine: Whooping cough vaccine is provided by the State Board of Health for free distribution. We advocate the giving of pertussis vaccine for treatment. We refer all request for immunizing treatment to the family physician. In whooping cough the nurses stress the care of children under 3 years of age, and even recommend that they see their physician regarding the vaccine treatment. We do not recommend it for treatment.

XI. *Visiting Nursing*—Bedside care of whooping cough patients by visiting nurses is permitted in 29 of the cities, and is not in Cleveland. Use of such care is encouraged in 23 of the cities and is not in 4, Baltimore, Birmingham, Madison, and Milwaukee. Such care is provided for in 4 cities if needed, and not in 24 cities. The extent to which such services are actually used for whooping cough patients is shown in Table IX for those 6 cities where reports of nurses' visits are available for each of the 10 years.

There were recorded 11,343 nurses' visits for bedside care of whooping cough patients, and 141,452 cases of whooping cough were reported in these 6 cities during the 10 year period, or 1 nurse visit for each 12.4 whooping cough patients. There is no record of the number of whooping cough patients actually served by these 11,343 nurse visits.

The following notes reflect certain attitudes toward visiting nurse services for whooping cough patients in their homes.

New York: Visiting nurses are allowed by the health department to visit whooping cough patients for bedside care with the permission of the attending physician. This service is encouraged because it is believed that nursing supervision favors isolation, and shortens the period of illness.

Philadelphia: Bedside care by visiting nurses is allowed by permission of attending physician, and is encouraged by the department of health only in complicated cases.

Pittsburgh: Visiting nurse service for bedside care is encouraged for cases developing complications.

XII. *Institutional Practice*—An observation period is required for children admitted to institutions for domiciliary care in 12 cities, but is not in 16 cities. The usual period of observation where this is required is 2 weeks, although in

TABLE IX

	1924	*1925*	*1926*	*1927*	*1928*	*1929*	*1930*	*1931*	*1932*	*1933*	*1924–33*
Detroit	19	53	87	103	226	151	228	285	203	138	1,493
East Orange	0	8	9	26	24	37	11	47	57	77	296
Minneapolis	0	78	56	29	71	104	20	107	81	117	663
New York	536	466	340	539	657	332	413	830	960	1,122	6,195
Philadelphia	147	150	105	59	206	141	62	195	507	46	1,618
Washington	34	96	102	58	49	94	46	198	260	141	1,078
Total	736	851	699	814	1,233	859	780	1,662	2,068	1,641	11,343

2 cities only 1 week is required, and in 3 cities 3 weeks.

In 3 cities immunization of children contacts is required if whooping cough appears in an institution for children, and in 1 other city it is provided for children in day nurseries if they have been exposed. In 26 cities there is no such requirement.

Where required, the method used for such immunization is left to the discretion of the attending physician.

The following notes indicate the various practices in this respect in several cities:

Baltimore: An observation period is recommended, not required, but is very generally practised. Length of observation, 3 to 4 weeks, depending upon circumstances. No admissions or visiting is permitted during a city-wide outbreak. There are only 3 institutions in the city which give domiciliary care for more than 50 preschool children at a time.

New Haven: In day nurseries immunization is recommended and the work is done by bureau physicians. Examination is made of contacts, for nasal and aural discharges, and cultures are taken to detect and isolate carriers.

Pittsburgh: An observation period is required if there is a history of exposure to a communicable disease. However, most admissions have been under observation for some time at their homes.

Providence: Hospitalization of cases and isolation of contacts for the incubation period are required.

V

OBSERVATIONS ON PROCEDURES IN GENERAL

The following comments seem called for and should be kept in mind while considering the analysis of incidence, death, and case fatality rates for measles and whooping cough in relation to the particular practices followed and the experience of the cities severally and in groups.

A. The reporting of measles and whooping cough is so incomplete in most of the cities that attributing any favorable change in incidence, death, and fatality rates solely to administrative or control procedures applied only to the reported cases would seem unjustified in the case of most of the cities.

Taking the experience of all the cities for which data are available for the 10 years, we find the following rates for all cities and for those with highest and lowest rates, as given in Table X.

B. The opinion of the health officer as to the probable completeness of reporting is rarely based on a controlled observation, or on estimates based on experimental sampling in his own city, or comparison with recorded experience elsewhere, and cannot be relied upon in most instances to express the probable true incidence of measles and whooping cough in the respective cities.

C. Verification of diagnosis is found to be unnecessary with rare exceptions and can hardly play an important rôle in the series of practices designed to control the incidence or deaths from these diseases.

D. Visits of instruction on establishing diagnosis, or during the time of required isolation are made with little uniformity as to the qualifications of the person so employed, or the frequency, or apparently the content of the visits.

In the 22 cities which kept a record of such visits to measles patients in 1925 there were made a total of 105,594 visits; by physicians (23,995), nurses (66,888), sanitary inspectors (15,075), and others (38), while there were 90,232 cases of measles reported among persons of all ages during this year, or an average of 1.17 visits per case.

In the 21 cities which kept a record

TABLE X

Measles

Case Incidence per 100,000, 1924–1933

	Under 1	*1 Year*	*2 to 4*	*5 to 14*	*15 and Over*	*All Ages*
All cities	866.7	1,955.1	2,940.9	177.3	26.9	431.1
Cities with Highest Rates	2,231.2	4,644.0	7,394.7	4,573.3	66.0	1,434.2
	Albuquerque	E. Orange	E. Orange	E. Orange	Albuquerque	Albuquerque
	1,503.8	3,972.3	5,652.4	3,901.9	44.5	1,345.3
	Newark	Providence	Albuquerque	Albuquerque	Berkeley	Madison
	1,457.5	3,590.7	5,233.7	3,849.9	40.8	1,205.9
	E. Orange	Albuquerque	Providence	Berkeley	Pittsburgh	Racine
Cities with Lowest Rates	515.7	538.5	1,085.0	787.8	15.2	184.9
	Birmingham	Birmingham	Birmingham	Birmingham	Newark	Charleston
	468.9	902.0	1,741.7	1,565.3	16.3	242.4
	S. Francisco	S. Francisco	S. Francisco	Pittsburgh	S. Francisco	Kansas C.
	718.2	1,312.3	1,749.9			287.9
	Los Ang. Co.	Los Ang. Co.	Los Ang. Co.			Chicago

Case Fatality Per Cent

	Under 1	*1 Year*	*2 to 4*	*5 to 14*	*15 and Over*	*All Ages*
All cities	5.1	3.6	0.58	(No case fatality per cent, or figure so small as to be of no significance)		0.73
Cities with Highest Rates	5.7	4.5	0.6			2.6
	Providence	Los Ang. Co.	Los Ang. Co.			Charleston
	5.3	4.0	Providence			1.8
	Baltimore	Newark	Pittsburgh			Albuquerque
	5.0	3.6	S. Francisco			1.5
	Pittsburgh	Providence				Birmingham
Cities with Lowest Rates	0.0	1.0	0.2			0.2
	Berkeley	E. Orange	E. Orange			Berkeley
	0.8	1.2	Berkeley			E. Orange
	E. Orange	Berkeley				Racine
						New Haven
						Portland
						Milwaukee

Death Rates per 100,000

	Under 1	*1 Year*	*2 to 4*	*5 to 14*	*15 and Over*	*All Ages*
All cities	52.1	76.8	17.2	2.4	0.9	3.2
Cities with Highest Rates	441.5	442.3	147.8	12.5	0.8	26.2
	Albuquerque	Albuquerque	Albuquerque	Albuquerque	Birmingham	Albuquerque
	125.6	144.2	31.5	8.2	0.5	4.8
	Providence	Providence	Madison	Madison	Madison	Charleston
	74.7	116.0	28.8	8.0		4.7
	Madison	Newark	Providence	E. Orange		Madison
Cities with Lowest Rates	0.0	11.1	6.7	0.3	0.0	0.7
	Berkeley	Madison	Berkeley	New Haven	Albuquerque	Portland
	11.6	23.4	6.4	1.1	and five	0.9
	E. Orange	S. Francisco	Buffalo	Hartford	others	S. Francisco
	15.6	25.3	9.6	1.4		1.3
	S. Francisco	Washington	S. Francisco	S. Francisco		Berkeley

of such visits to whooping cough patients in 1933 there were made a total of 58,359 visits; by physicians (6,544), nurses (43,671), sanitary inspectors (7,169) and others (375), while there were 34,920 cases of whooping cough reported among persons of all ages during this year, or an average of 1.67 visits per case.

E. Visits after release from isolation, made only in 6 cities, may be shown to have an educational and protective value

TABLE XI

Whooping Cough—1924–1933

Case Incidence per 100,000

	Under 1	*1 to 2*	*2 to 4*	*5 to 14*	*15 and Over*	*All Ages*
All cities	1,407.5	1,451.1	1,629.5	558.4	5.6	172.5
Cities with Highest Rates	3,144.0 Albuquerque	3,763.6 E. Orange	5,684.5 E. Orange	1,931.0 E. Orange	17.5 Pittsburgh	589.2 Madison
	2,915.0 E. Orange	3,157.9 Berkeley	4,103.3 Berkeley	1,873.0 Berkeley	15.2 Albuquerque	563.8 E. Orange
	2,692.5 Berkeley	2,944.3 Albuquerque	2,997.0 Albuquerque	1,739.1 Albuquerque	14.0 Berkeley	536.2 Albuquerque
					9.3 E. Orange	530.9 Racine
						499.1 Berkeley
Cities with Lowest Rates	967.4 S. Francisco	821.0 S. Francisco	1,012.6 S. Francisco	270.4 Hartford	1.4 S. Francisco	42.9 Portland
	1,201.3 Pittsburgh	1,186.3 Pittsburgh	1,310.3 Los Ang. Co.	426.8 Pittsburgh	4.1 Newark	76.6 Charleston
	1,310.9 Los Ang. Co.	1,189.8 Los Ang. Co.		541.2 Newark	4.4 Hartford	85.3 New York C.

Case Fatality Per Cent

	Under 1	*1 Year*	*2 to 4*	*5 to 14*	*15 and Over*	*All Ages*
All cities	9.9	4.4	0.7	0.09	0.12	2.2
Cities with Highest Rates	13.6 Pittsburgh	7.4 Pittsburgh	0.7 Los Ang. Co.	(No case fatality per cent, or figure so small as to be of no significance)		11.2 Charleston
	12.5 Los Ang. Co.	5.0 New Haven				9.2 Birmingham
	11.6 S. Francisco					5.0 Albuquerque
Cities with Lowest Rates	2.4 E. Orange	1.1 Berkeley	0.0 E. Orange			0.3 E. Orange Madison
	3.7 Berkeley	2.2 E. Orange	0.2 Berkeley			0.4 Berkeley
		3.6 Los Ang. Co.	0.4 Newark			0.7 Milwaukee

Death Rates per 100,000

	Under 1	*1 to 2*	*2 to 4*	*5 to 14*	*15 and Over*	*All Ages*
All cities	141.4	68.2	12.1	0.7	0.01	3.9
Cities with Highest Rates	949.2 Albuquerque	232.8 Albuquerque	77.4 Albuquerque	8.3 Albuquerque	0.1 Rochester	27.0 Albuquerque
	284.3 Charleston	178.9 Birmingham	37.1 Birmingham	2.4 Charleston	0.0 All others	9.2 Birmingham
	256.9 Baltimore	140.9 Baltimore	18.8 Charleston	1.6 Seattle		8.6 Charleston
						7.3 Baltimore
Cities with Lowest Rates	69.4 E. Orange	11.1 Madison	0.0 E. Orange	0.0 All except	0.0	1.5 Portland
	79.9 Seattle	23.9 Seattle	Madison	Rochester		1.8 Berkeley
	82.9 Chicago	32.7 S. Francisco	6.6 Seattle	0.1		Madison
			6.7 Berkeley			Seattle 1.9 S. Francisco

for other members of the family and prove useful in encouraging a successful convalescence for the patient.

F. The difference in placarding practices may offer some opportunity for comparative results although the incompleteness of case reporting may well vitiate any deductions.

G. Isolation practices from the points of view of character and duration may offer some basis of comparison if not confused by coincident variations in reporting and other factors. On the face of the returns it does not appear that long periods of isolation offer any better promise of protection than do the shortest authorized.

H. The formality of official release from isolation does not appear to offer any useful basis for comparison of results.

I. Quarantine of household contacts appears to be employed with but indifferent consistency even for susceptible children of school age or under.

J. Hospitalization is evidently not considered an essential or important feature of a plan of control, but is held in reserve where poverty and poor housing indicate removal. Any practice that affects no more than 4.5 per cent of the reported cases of measles, or 2.9 per cent of those of whooping cough can hardly be looked to for explanation of changes in incidence or death rates.

K. Artificial immunization is either available to so small a proportion of susceptibles of tender age, or has been used for so brief a period that statistical expression of results can hardly be looked for.

L. Visiting nurse services may prove to have been of some definite benefit where generally used, even though so few cities have availed themselves of this resource.

M. Precautions against introduction of infection into children's institutions may be shown to be of definite value to the institution, but can hardly affect enough persons to influence the incidence and death rates in a particular city.

N. The 10 year period under study appears to have been one of generally falling death rates from both measles and whooping cough, for an explanation of which the administration of control procedures in the 32 cities can be but a partial explanation.

O. The generally falling birth rate appears to have been a factor of significance in determining some part at least of the fall in the death rates of measles and whooping cough during the 10 year period under study.

In section X will be found specific suggestions for the better application of existing knowledge for the reduction in deaths from measles and whooping cough. There are but few of the 32 cities, and these the smaller rather than the larger communities, in which a reasonably complete program for the control of these two diseases, consistent with present-day knowledge, was carried out even in principle during the decade under consideration.

VI

RELATIONS OF INCIDENCE, CASE FATALITY, AND DEATH RATES FROM MEASLES TO CONTROL PROCEDURES IN PARTICULAR CITIES AND GROUPS OF CITIES

A. REPORTED CASE INCIDENCE OF MEASLES

Has the recorded case incidence of measles changed during the 10 years 1924 to 1933?

If significant differences in incidence rates are found, are these actual or only apparent?

If any actual change of significant amount has occurred, was it causally

TABLE XII

Measles Incidence per 100,000—Under 1 Year of Age (8 Cities)

	1924	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930*	*1931*	*1932*	*1933*	*1929–33*	*1924–33*
Berkeley	1,363.6	339.0	1,573.0	2,234.6	333.3	1,168.5	221.0	989.0	2,732.2	108.7	216.2	852.5	1,008.3
East Orange	760.5	496.3	4,860.3	834.3	1,986.0	1,799.2	458.2	1,797.8	220.8	433.4	2,766.0	1,147.4	1,475.5
Newark	2,129.8	1,125.0	2,788.5	435.2	1,631.4	1,629.1	482.6	2,765.2	433.3	961.8	2,214.1	1,363.6	1,503.8
Providence	331.6	2,271.2	1,338.4	192.2	4,776.0	2,531.4	1,683.2	315.8	2,337.0	4,917.1	29.1	1,847.9	2,215.5
Boston	838.5	1,293.6	651.7	1,121.4	1,160.9	1,011.4	141.9	.....	496.6	810.5	1,366.7	689.9	877.1
Los Ang. Co.	1,143.5	390.8	370.1	1,182.9	306.0	663.7	265.6	1,437.7	489.3	302.1	1,252.5	757.8	718.2
Pittsburgh	464.6	1,867.8	831.3	1,200.6	1,030.3	1,078.0	368.4	1,283.8	855.3	1,358.0	182.3	810.2	847.5
S. Francisco	213.7	199.3	970.3	773.6	46.6	440.5	218.6	1,176.5	283.6	680.7	127.2	498.0	468.9

Measles Incidence per 100,000—1 Year of Age (8 Cities)

Berkeley	3,750.0	452.0	4,606.7	2,234.6	222.2	3,325.8	552.5	2,637.4	6,448.1	869.6	756.8	2,251.4	2,781.2
East Orange	2,810.3	2,004.7	14,946.6	834.3	8,894.2	6,027.5	847.5	4,628.5	981.6	3,333.3	6,343.3	3,213.9	4,644.1
Newark	3,370.0	2,178.6	3,868.8	435.2	5,386.8	3,070.5	748.6	5,267.1	694.7	1,727.1	4,851.0	2,633.5	2,865.3
Providence	200.8	3,604.6	9,654.4	192.2	8,696.7	4,405.6	2,811.4	370.0	4,802.5	9,534.8	26.0	3,499.9	3,972.3
Boston	3,202.7	4,806.4	4,505.9	1,121.4	5,824.7	4,175.7	1,103.6	.....	3,630.8	.....	2,334.7	2,344.8	3,517.9
Los Ang. Co.	1,962.8	365.2	558.1	3,046.3	138.3	1,198.1	327.7	2,505.1	629.4	357.6	3,021.1	1,395.6	1,312.3
Pittsburgh	831.1	4,325.2	1,868.4	2,754.6	2,597.8	2,572.1	624.8	2,407.8	1,643.3	2,950.6	215.9	1,569.0	2,030.4
S. Francisco	274.8	230.0	1,771.1	1,083.1	108.8	693.1	452.8	2,698.0	646.1	1,598.9	175.0	1,115.7	902.0

Measles Incidence per 100,000—2–4 Years of Age (9 Cities)

Berkeley	6,069.7	109.7	6,928.6	13,856.9	204.7	5,443.2	333.8	4,539.5	11,192.8	720.3	368.3	3,415.2	4,373.2
East Orange	5,078.0	1,002.0	21,253.5	2,215.1	15,912.8	9,080.7	607.3	8,888.0	1,546.0	3,140.3	14,309.1	5,687.6	7,394.7
New Haven	1,142.9	4,225.1	4,673.2	932.6	10,396.6	4,335.8	618.5	589.7	15,789.5	94.4	294.0	3,485.6	3,945.6
Newark	3,787.3	2,461.9	11,342.5	601.7	6,072.6	4,818.3	597.9	7,749.8	705.6	2,002.4	6,239.9	3,434.8	4,162.5
Providence	261.9	4,348.5	12,573.3	93.7	11,241.2	5,678.3	3,441.8	371.0	7,066.0	12,945.2	73.0	4,768.7	5,233.7
Boston	4,352.4	5,922.3	3,183.3	2,578.3	7,762.6	5,012.5	835.9	406.0	1,726.6	.....	4,195.3	2,226.5	4,004.5
Los Ang. Co.	2,753.5	325.4	615.9	3,046.3	127.5	1,601.4	158.0	4,082.4	934.7	170.2	3,773.8	1,856.4	1,749.9
Pittsburgh	1,154.5	5,898.2	2,781.5	2,754.6	3,352.1	3,428.1	1,040.9	4,429.0	2,535.6	4,427.2	134.6	2,515.8	2,979.3
S. Francisco	530.6	280.2	3,526.2	1,083.1	192.8	1,392.1	1,089.4	4,984.1	1,364.3	2,906.6	105.8	2,088.9	1,741.7

Measles Incidence per 100,000—5–14 Years of Age (10 Cities)

Berkeley	6,491.9	19.5	4,946.0	13,838.6	108.0	5,086.4	140.5	3,908.5	9,450.9	212.7	160.0	2,757.5	3,849.9
East Orange	2,882.4	549.3	14,400.1	998.7	9,932.4	5,793.0	406.9	4,963.7	539.5	2,228.0	8,842.2	3,432.8	4,573.3
Hartford	1,707.2	466.1	2,218.8	62.9	1,812.9	1,252.8	1,330.1	994.5	2,335.8	198.4	353.4	1,032.3	1,137.2
Newark	1,955.2	1,309.7	4,461.6	251.3	5,195.8	2,638.7	245.8	3,946.6	318.2	1,140.8	6,638.3	2,465.2	2,551.1
Providence	72.2	2,365.5	5,213.7	59.2	4,377.6	2,429.4	1,556.5	228.3	4,687.9	6,983.4	29.1	2,703.6	2,569.6
Baltimore	1,788.9	92.7	5,302.3	268.5	5,139.2	2,698.7	39.9	201.5	6,805.2	51.7	43.0	1,428.0	2,046.1
Boston	1,671.9	2,434.9	1,565.4	1,749.7	2,988.8	2,083.3	284.0	.....	870.5	1,194.7	2,473.0	1,208.8	1,691.2
Los Ang. Co.	2,962.7	325.7	449.2	5,722.1	281.8	1,948.9	149.2	5,143.6	1,398.9	86.5	4,792.5	2,355.0	2,184.3
Pittsburgh	521.8	3,496.9	1,252.6	1,998.2	1,740.4	1,804.0	629.3	2,261.8	1,548.9	2,210.9	56.2	1,338.9	1,565.3
S. Francisco	241.1	181.3	4,753.2	2,076.4	1,164.5	1,691.5	1,422.7	7,020.8	1,161.5	4,067.1	111.4	2,745.1	2,232.4

TABLE XII (Cont.)

Measles Incidence per 100,000—15 Years of Age and Over (10 Cities)

	1924	1925	1926	1927	1928	1924–28	1929	1930	1931	1932	1933	1929–33	1924–33
Berkeley	86.7	9.1	48.7	145.9	25.9	63.4	7.8	30.2	92.1	8.5	5.5	28.7	44.5
East Orange	39.2	19.0	79.5	4.0	82.4	45.3	7.4	48.8	5.3	3.4	20.0	16.9	30.0
Hartford	45.4	22.3	56.0	3.4	21.1	29.4	37.4	18.0	20.8	6.3	4.7	17.2	23.0
Newark	13.5	10.1	39.9	4.8	33.1	20.4	3.7	28.1	3.4	2.1	13.8	10.2	15.2
Providence	3.9	23.5	85.9	3.9	30.6	29.6	11.9	82.8	10.1	32.8	0.0	27.4	28.5
Baltimore	41.3	7.9	67.5	3.1	68.0	37.6	1.9	9.3	63.9	1.6	1.0	15.5	26.3
Boston	48.2	56.4	60.2	23.4	66.0	50.8	8.0	....	16.9	12.6	12.2	12.4	33.5
Los Ang. Co.	92.4	13.0	9.9	114.2	17.5	48.6	3.7	51.3	18.1	1.7	43.1	23.9	34.3
Pittsburgh	20.8	74.8	38.1	38.9	50.0	44.6	14.7	79.2	36.6	55.0	1.6	37.3	40.8
S. Francisco	9.1	7.6	23.8	38.3	21.7	20.4	11.9	26.4	7.7	15.9	1.8	12.6	16.3

Measles Incidence per 100,000—All Ages (31 Cities)

Albuquerque	4,055.9	108.1	232.2	3,105.3	3,074.6	2,125.5	46.6	1,437.7	253.9	2,504.0	112.6	280.5	1,434.2
Berkeley	1,336.6	24.3	1,101.0	2,757.1	50.2	1,055.0	47.4	783.1	1,906.5	72.9	49.8	567.7	791.7
Charleston	212.3	7.7	177.2	393.5	110.7	180.0	3.2	17.7	912.8	9.8	6.6	190.0	184.9
East Orange	708.3	168.3	3,172.5	257.2	2,144.0	1,306.3	98.9	1,088.5	142.6	438.6	1,718.2	709.8	989.0
Madison	89.5	298.9	5,757.0	336.5	51.3	1,312.5	1,292.7	2,492.5	210.7	191.4	2,663.5	1,372.9	1,345.3
Racine	33.6	522.1	3,473.0	323.9	206.0	912.1	3,232.3	224.3	174.8	3,811.2	27.0	1,486.7	1,208.9
Hartford	563.3	173.7	715.0	31.2	560.7	408.3	382.9	251.4	666.7	67.7	96.9	290.8	347.2
Kansas City, Kans.	.....	.....	.....	.....	.....	.....	901.6	39.2	366.6	113.1	904.1	465.2	242.4
New Haven	209.7	717.1	889.2	223.8	1,754.2	758.9	123.6	123.0	2,851.8	16.6	53.5	633.7	696.3
Syracuse	715.1	26.1	1,241.5	1,594.6	1,388.3	1,004.1	16.9	136.5	93.5	3,257.6	12.7	714.1	852.6
Birmingham	.....	.....	.....	.....	551.9	551.9	15.8	230.9	619.2	10.5	15.8	177.1	234.9
Minneapolis	183.5	73.1	835.8	53.6	367.3	304.0	1,058.0	206.3	378.4	96.5	1,608.6	673.0	496.8
Newark	710.0	458.7	1,635.5	95.0	1,446.3	870.5	99.9	1,281.0	114.0	350.3	1,639.8	699.6	783.7
Portland	4.0	28.4	336.8	910.3	215.4	302.8	520.0	178.6	180.1	701.1	32.0	321.1	312.3
Providence	40.1	787.5	1,943.4	24.9	1,629.3	888.0	542.8	132.2	1,334.5	2,165.7	9.7	838.1	862.7
Rochester	159.7	546.7	682.9	99.5	486.4	395.5	218.0	154.4	563.4	1,122.2	14.8	415.6	405.8
Seattle	2,421.6	34.8	267.9	919.4	872.8	897.0	53.6	1,164.4	209.0	1,629.5	28.8	618.2	752.8
Washington	92.5	171.1	1,441.2	34.6	749.5	500.2	94.2	183.8	859.0	54.7	207.3	259.6	376.9
Baltimore	552.0	276.6	1,621.3	84.1	1,542.6	818.5	18.1	55.9	1,846.1	20.1	15.5	391.1	600.1
Boston	623.9	872.6	563.1	574.0	1,059.9	739.2	115.6	1,089.5	306.4	352.1	673.6	507.8	622.3
Buffalo	193.3	744.5	97.5	166.2	1,157.4	475.0	171.6	84.2	883.2	133.9	315.4	318.4	394.5
Chicago	200.1	430.0	219.0	554.7	50.7	290.2	532.4	30.4	353.6	284.0	235.7	285.9	287.9
Cleveland	271.8	312.8	1,585.1	33.8	363.3	513.1	1,183.6	32.4	430.9	1,611.0	10.9	652.1	584.6
Detroit	297.9	126.9	1,130.5	76.6	1,000.4	537.6	220.1	915.7	44.9	780.0	516.9	498.6	516.3
Los Angeles	587.2	91.9	52.2	986.5	59.2	353.3	46.9	534.9	233.9	43.4	651.4	309.1	328.1
Los Ang. Co.	738.7	90.7	125.7	1,312.5	73.1	466.3	44.2	1,158.6	310.4	33.8	1,083.3	535.2	506.2
Milwaukee	305.9	1,266.5	821.4	594.0	147.8	622.8	2,253.8	76.7	838.9	2,394.9	22.4	1,108.8	878.5
New York	541.7	150.0	616.2	31.9	522.0	371.7	37.1	339.5	374.0	143.4	493.0	280.0	323.7
Philadelphia	203.0	419.6	651.9	50.9	810.2	428.2	76.9	258.1	788.2	20.6	370.1	303.2	364.7
Pittsburgh	205.3	1,163.7	468.4	692.2	606.8	528.1	200.3	772.4	485.6	743.3	24.4	444.3	533.4
San Francisco	61.3	42.8	740.7	379.1	163.4	279.8	217.7	1,029.6	190.6	585.6	20.0	405.5	345.8

related to one or more of the measures used for control?

What relation does the number of recorded cases bear to the probable total of persons attacked by measles?

These and a multitude of similar questions call for answer, and can to some extent be resolved by study of the data available.

While in 1924 only 8 of the cities recorded the incidence of measles by the 5 age groups selected (under 1 year, 1 year, 2 to 4 years, 5 to 14 years, 15 years and over) namely Berkeley, Boston, Los Angeles County, East Orange, Newark, Pittsburgh, Providence, and San Francisco, there were 18 which in 1933 tabulated their case reports in this detail.

All but 3 of the 32 cities recorded the total cases of measles in 1924. In Austin, Tex., no official record is expected or is made of cases of measles. Kansas City, Kans., recorded the total incidence of cases of measles (all ages) for the first time in 1929. Birmingham, Ala., recorded the incidence of measles (by age groups and total) for the first time in 1928.

The incidence rates of measles by separate years, by the two 5 year periods and for the entire 10 year period for each of the 5 age groups selected and for persons of all ages have been calculated so far as records are available, and are here presented in 3 tables; Table XII for the 31 cities separately, thus revealing the gradual increase from 1924 to 1933 in the completeness of the records available; Table XIII for the total exposed population for which records are available in separate years and for the separate age groups, the population base in this tabulation thus being of gradually increasing size; and Table XIV for those 8 cities which alone among the 32 studied, recorded both cases and deaths by the selected age groups for each of the 10 years.

It will be noted from Table XII that the reported annual incidence rate of measles for children under 1 year of age, averaged for the quinquennium 1929–1933, was less than that for 1924–1928 in 6 of the 8 cities for which completed data were available for the 10 year period, the incidence rates for Los Angeles County and San Francisco

TABLE XIII

The Reported Case Incidence of Measles Combined per 100,000 of Corresponding Populations for Those Cities, Years, and Age Groups for Which Records Are Available, for the Years Separately, the Two Quinquennial and the Decennial Periods

	Under 1	*1 to 2*	*2 to 4*	*5 to 14*	*15 and Over*	*All Ages*
1924	894.1	1,851.1	2,336.4	1,515.1	36.5	413.7
1925	1,067.0	2,912.0	3,641.4	1,608.7	31.9	328.6
1926	1,735.7	4,074.9	5,510.7	3,370.4	73.1	701.9
1927	816.6	1,850.9	2,682.6	1,657.1	28.4	306.6
1928	1,172.0	2,654.2	3,648.3	1,961.0	29.8	571.8
1924–28	1,126.4	2,633.5	3,579.6	2,016.2	37.8	465.7
1929	926.2	1,644.4	2,062.8	1,295.6	30.8	284.0
1930	799.5	1,387.1	2,328.9	1,645.6	24.3	401.5
1931	897.6	2,007.0	2,793.4	1,687.0	21.0	476.5
1932	1,088.7	2,404.0	3,938.1	2,191.6	18.3	420.9
1933	616.0	1,187.0	1,720.7	1,307.0	10.3	412.0
1929–33	866.4	1,641.8	2,543.5	1,633.1	20.4	400.1
1924–33	966.7	1,955.1	2,940.9	1,777.3	26.9	431.1

TABLE XIV

Measles Case Incidence per 100,000—8 Cities *

	Under 1	*1 to 2*	*2 to 4*	*5 to 14*	*15 and Over*	*All Ages*
1924	881.2	1,911.8	2,572.6	1,438.0	34.9	443.1
1925	1,181.3	2,914.5	3,608.2	1,803.7	33.4	572.2
1926	1,463.7	3,482.7	4,995.3	2,702.8	40.4	804.4
1927	946.6	2,114.9	3,163.7	2,401.6	43.5	630.9
1928	1,186.8	3,547.0	4,544.7	2,474.7	38.9	726.4
1924–28	1,132.0	2,796.7	3,783.2	2,175.1	38.4	638.3
1929	393.4	950.9	928.3	564.1	9.0	161.7
1930	1,479.8	2,790.0	4,685.7	3,944.1	50.0	956.4
1931	693.9	1,956.8	2,103.4	1,529.2	18.3	398.4
1932	1,129.1	2,378.9	3,225.8	2,130.5	19.8	552.2
1933	951.6	1,903.2	2,757.2	2,569.9	13.9	591.6
1929–33	893.4	1,914.9	2,624.1	2,073.2	20.9	519.7
1924–33	1,017.9	2,374.4	3,221.2	2,028.4	29.5	578.3

* The 8 cities were those with records of cases and deaths for measles by the 5 age groups for all 10 years: Berkeley, Boston (not in 1930 and 1932), East Orange, Los Angeles County, Newark, Pittsburgh, Providence, San Francisco.

being slightly higher in the second than in the first quinquennium.

The same is true among the same 8 cities for children 1 year of age but less than 2, and in 7 of the 9 cities for children 2 years of age but less than 5.

Among the 10 cities for which data are available for children 5 years of age but less than 15, 7 of the cities showed a drop in the incidence rate in the second quinquennium while in 3 cities, Providence, Los Angeles County, and San Francisco, the incidence rates rose for the second quinquennium.

In all of the same 10 cities the incidence rates were lower for children 15 years of age and over in the second quinquennium than in the first.

Among the 31 cities for which we have incidence rates for both quinquennia for persons of all ages, the rate was lower in the second than in the first period in 20, and higher in the second period in 10 cities (Charleston, Madison, Racine, Minneapolis, Portland, Rochester, Cleveland, Los Angeles County, Milwaukee, and San Francisco).

However, before suggesting any causal relationships between trends in case incidence, and the procedures employed in individual cities or groups of cities, the reliability of the reporting of measles must be considered. The irregular periodicity in recurrence of measles in a community, varying with the size, age distribution, birth rate, and many other and less calculable factors, and the variability in compliance with the legal requirement that all cases of measles be reported to the health department, combine to cast doubt upon the comparability of the incidence rates as reported by the several cities and for the separate years and age groups. Some approximation to the probable completeness of reporting of measles may be reached by comparing the combined experience of the 10 consecutive years with the number of live births reported for the same years in the respective communities.

This comparison will be found in the following 2 tables, Table XV giving the percentage of total live births in the 10 year period, represented by the reported cases of measles at all ages, and Table XVI the percentage of all live

TABLE XV

Thirty Cities Arranged in Order of the Per Cent of Births Represented by Reported Cases of Measles at All Ages in the Decennium 1924–1933, and in the Two Contained Quinquennia, and Case Fatality for the Same Period

		1924–1933		1924–1928		1929–1933	
		Per Cent Cases of Births	Case Fatality Per Cent	Per Cent Cases of Births	Case Fatality Per Cent	Per Cent Cases of Births	Case Fatality Per Cent
C	East Orange	112.1	0.2	171.3	0.3	74.2	0.2
	Berkeley	85.8	0.2	99.1	0.2	70.7	0.1
	Racine	59.4	0.2	42.5	0.2	76.8	0.2
	Albuquerque	57.3	1.8	87.6	2.1	34.4	1.4
	Seattle	54.0	0.3	60.8	0.3	47.0	0.2
	Madison	52.5	0.3	51.3	0.4	54.9	0.3
	Milwaukee	45.5	0.2	29.3	0.2	63.8	0.2
	Syracuse	42.9	0.3	47.1	0.4	38.5	0.2
B	Providence	37.4	0.7	35.5	1.1	39.6	0.4
	Newark	34.8	0.5	35.9	0.8	33.9	0.3
	New Haven	32.5	0.2	32.9	0.4	31.8	0.1
	Los Angeles Co.	32.4	0.4	25.8	0.6	38.6	0.3
	Baltimore	30.9	0.6	38.3	0.7	32.2	0.4
	Boston	29.4	0.9	29.9	1.2	28.7	0.5
	Cleveland	29.1	0.5	22.6	0.7	37.0	0.3
	Minneapolis	26.7	0.4	14.5	0.9	40.8	0.2
	San Francisco	26.7	0.3	19.3	0.4	35.1	0.2
	Detroit	25.1	1.0	22.5	1.5	28.2	0.6
	Pittsburgh	24.1	0.8	26.0	1.0	21.9	0.5
	Los Angeles	23.7	0.4	19.1	0.6	29.9	0.3
	All Cities	23.4	0.7	22.4	1.0	24.2	0.4
	Rochester	22.2	0.7	19.6	0.6	25.3	0.7
	Portland	20.7	0.2	17.7	0.2	24.3	0.2
A	Philadelphia	19.5	0.8	20.6	1.0	17.9	0.6
	Washington	19.5	0.4	27.7	0.5	13.4	0.3
	Buffalo	19.2	0.6	21.1	0.7	17.1	0.4
	New York City	18.1	1.2	18.8	1.6	17.3	0.6
	Chicago	16.8	0.7	15.2	0.9	18.6	0.6
	Hartford	13.8	0.9	15.4	1.1	12.3	0.7
	Birmingham	6.9	1.5	4.6	1.2	9.4	1.6
	Charleston	6.7	2.6	6.7	1.0	6.8	4.1

births represented by the reported cases of measles under 5 years of age, the cities in each list being arranged in the order of declining magnitude of these percentages.

Parallel columns give the case fatality per cent calculated from the reported cases and deaths from measles for the ages, for the particular city and the 5 or 10 year period referred to.

In 20 cities the reporting of cases of measles at all ages was above, and in 10 it was below the weighted average experience of all the cities combined in this respect. There were 15 cities in which the ratio of cases to births was 29.1 per cent or more, and 15 in which the ratio was 26.7 per cent or less.

It will be further noted that while 15 cities in the first quinquennium (1924–1928) reported measles cases of all ages at a lower ratio to live births than the average experience of all cities in the 10 year period, only 9 cities

showed so low a ratio in the second quinquennium.

With a reduction in live births in these cities of 250,171 in the second as compared with the first quinquennium (11.1 per cent) there was a decrease of 20,909 cases of measles reported (3.9 per cent).

It would appear that there had been some improvement in the relative completeness with which measles had been reported in these cities during the decade (1924–1933).

In general, as would be expected, the case fatality per cent in a given city is in the reverse order, the cities with high reporting ratios having the lower fatality rates and *vice versa*.

It must at once appear that no reasonably useful purpose is likely to be served by attempting to evaluate the relative effectiveness of procedures designed to control measles among cities varying so widely in the extent to which this disease is reported.

To consider alone the mean and the extremes of this list of cities it must be obvious that such a disease as measles, generally observed to attack all exposed susceptible persons, particularly those under 15 years of age, and especially in urban centers of population, does not in fact, over a 10 year period, exhibit any such wide local variations in actual incidence.

The health officer of East Orange, N. J., reports that for every 100 live births in his suburban, chiefly residential, community, in 10 years 112 cases of measles were recorded in the same period, while in the cities of Birmingham, Ala., and Charleston, S. C., the health officers report that less than 7 cases of measles were recorded for each 100 live births in the same decennium. Furthermore, this cannot be explained

TABLE XVI

Measles

Seventeen Cities Arranged in Order of the Per Cent of Births Represented by Reported Cases of Measles Under 5 Years of Age in the Two Quinquennia and the Decennium, 1924 to 1933

	1924–1933		*1924–1928*		*1929–1933*	
	Per Cent Cases of Births	*Case Fatality Per Cent*	*Per Cent Cases of Births*	*Case Fatality Per Cent*	*Per Cent Cases of Births*	*Case Fatality Per Cent*
East Orange	40.9	0.3	58.4	0.5	27.4	0.1
Berkeley	22.5	0.3	25.7	0.5	19.8	0.0
Providence	16.0	1.6	16.9	2.0	15.0	0.9
Syracuse	14.2	0.8	15.2	1.1	13.3	0.3
Newark	12.9	1.3	13.5	0.6	11.1	1.8
New Haven	12.0	0.6	13.6	0.9	10.1	0.2
Baltimore	11.3	1.5	14.4	1.8	7.2	1.1
Boston	11.1	2.2	14.1	2.3	8.8	2.1
Albuquerque	10.9	8.8	8.8	18.9	13.3	3.5
Pittsburgh	9.6	1.8	10.8	2.4	7.3	1.0
Detroit	9.1	2.4	7.3	3.9	11.0	1.3
Los Angeles Co.	7.3	1.7	5.7	2.2	8.8	1.1
Rochester	7.1	1.4	7.4	1.1	6.8	1.9
Hartford	5.4	2.2	6.5	2.3	4.1	2.0
San Francisco	5.4	1.0	4.0	1.7	6.9	0.5
Chicago	4.8	2.1	2.7	4.1	7.2	1.2
Birmingham	2.1	5.7	1.5	7.8	2.9	4.4

by incomplete reporting of births in East Orange, or by greater completeness of this record in the other two cities, but must be accepted as indicating a close approximation to complete record of measles in the one city and only partial reporting of this disease in the other two cities.

The record of more reported cases of measles in East Orange than reported live births in the decennium 1924–1933 is apparently explained by the following statement of the health officer.

> Our largest two epidemics (1,957 cases in 1926 and 1,395 cases in 1928) fell in the first quinquennium. In no previous epidemics had as many as 900 cases been reported, although in 1922 we had 870. I am inclined to believe that these two outbreaks occurring during a period of our greatest apartment house development, with an annual turnover in the schools each year of 40 per cent of pupils, were related to the housing expansion and the increased numbers of young children in the population, even though the birth rate was gradually falling over this entire period. These factors, added to the fact that we do seriously try in a variety of ways to secure complete reporting, doubtless account to some degree for the high incidence of measles reported, particularly in the first quinquennium.

Also it may be noted that the experience of all 30 cities combined is that less than 24 cases of measles were recorded in 10 years for each 100 live births in the same period.

The bearing of this wide variation in completeness of reporting measles upon the calculated case fatality rates from this disease in the various cities will be dealt with later.

It might be expected that cities from which a high ratio of reported cases of measles over a 10 year period, to live births reported for the same period, would show a different distribution of cases reported among the several age groups than would be the case in cities with a low ratio of cases to births.

Table XVII shows, however, no apparently significant differences between the experience of East Orange, Berkeley, and Providence, all communities with a ratio of 37.4 per cent or higher of cases to births, and that of Birmingham, the only one of the cities with a ratio below the average (23.4 per cent) for which incidence by age groups is available for the entire 10 years.

It would seem likely, unless special efforts are made, as has been the case in a few cities, to discover unreported cases of measles by house visits and by publicity or educational methods, that relative incompleteness of reporting of measles affects the various age groups uniformly rather than selectively to the disadvantage of any particular age group.

For convenient reference the percentage distribution of population by certain age groups is given for the 10 year period for the 5 cities referred to in Table XVII.

Distribution of Population
(10 Years 1924–1933)

	Under 5 *Per cent*	*5 to 14* *Per cent*	*15 & over* *Per cent*
East Orange	6.3	13.3	80.3
Berkeley	6.0	14.2	79.7
Los Angeles Co.	7.7	16.7	75.6
Providence	7.6	18.4	74.0
Birmingham	8.8	18.2	73.0

From Tables XIII and XIV it will appear with increasing force that at each age group and for all ages the reported incidence of measles was less in the second quinquennium than in the first.

The simplest and apparently the most probable explanation for such a trend among cities with a fairly adequate reporting of measles is that fewer live births occurred in the second than in the first period. With a falling birth rate and a gradually increasing average age of the population, not otherwise added to by immigration of persons under 15 years of age, it is to be ex-

TABLE XVII

Percentage Distribution of Measles Cases by Age Groups in Certain Cities for 10 Years, 1924–1933, Consecutively

A Group of Cities with High Ratios of Cases to Births	*Under 1*		*1–2*		*2–4*		*5–14*		*15 and Over*		*Total Cases*
	Cases	*%*	*Cases*	*%*	*Cases*	*%*	*Cases*	*%*	*Cases*	*%*	
East Orange	126	1.9	385	5.9	1,829	28.0	4,019	61.7	159	2.5	6,518
Berkeley	91	1.4	251	4.0	1,295	20.7	4,331	69.3	180	4.6	6,249
Los Angeles County	692	2.1	1,254	3.8	5,442	16.6	23,718	72.3	1,677	4.2	32,873
Providence	882	4.1	1,653	7.6	6,721	31.0	11,882	54.8	524	2.4	21,662
A City with Lower than Average Ratio of Cases to Births											
Birmingham	85	2.5	137	3.6	951	25.4	2,268	60.5	303	8.1	3,744

TABLE XVIII

Live Births and Reported Cases of Measles, 1924–1928 and 1929–1933 in Five Cities

	Live Births			*Reported Cases of Measles—All Ages*			*Reported Cases of Measles Under 5 Years of Age*		
	1924–28	*1929–33*	*Decrease*	*1924–28*	*1929–33*	*Decrease*	*1924–28*	*1929–33*	*Decrease*
Berkeley	3,862	3,421	—441	3,828	2,421	1,407	962	676	—286
Boston	95,023	69,393	—25,630	28,425	19,935	—8,490	13,447	3,713	—9,734
Newark	52,645	45,931	—6,664	18,810	15,592	—3,218	7,665	5,022	—2,643
Pittsburgh	77,215	68,743	—8,472	20,099	15,102	—4,997	8,326	5,769	—2,557
Providence	30,889	26,963	—3,926	10,932	10,630	—302	5,226	4,030	—1,196
Total	259,639	214,505	—45,133	82,144	63,730	—18,414	35,626	19,210	—16,416

pected that measles incidence would correspondingly fall.

As a matter of fact there were 45,138 fewer live births (17.4 per cent) in 5 of these 8 cities in the second than in the first quinquennium. In East Orange there was an average of 24 fewer live births annually (2.6 per cent) in the second than in the first quinquennium.

In these same cities there were reported 18,414 fewer cases (22.4 per cent) of measles at all ages and 16,416 fewer cases (46.1 per cent) under 5 years of age in the second than in the first quinquennium.

While Table XIII gives the accumulated experience of all cities for which the data for any age group were available, even if for only 1 of the 10 years, and Table XIV gives the experience of 8 cities for which the record is complete for each group and for each year (with the exception noted in regard to Boston) there is entire consistency in the two sets of rates, to the effect that the case incidence rates at each age group and for all ages combined were lower in the second than in the first quinquennium.

If we were to assume from a lowering of the incidence rates which is observed to have occurred from the first to the second quinquennium that there had been an improvement in the methods of control of measles or that the same methods had been applied more consistently, uniformly or upon a substantially larger fraction of the cases of measles reported we should have first to consider various related facts.

Since lower incidence may mean fewer susceptibles as well as a reduction in the attack rate we are concerned with the fact that some cities with a reduction in births from the first to the second quinquennium showed a drop in incidence rates and others showed a rise during the same period.

Living Births in 8 Cities with a Higher Measles Incidence per 100,000 at All Ages in the Second than in the First Quinquennium

	1924–1928	1929–1933	Reduction
Charleston	8,628	8,601	27
Racine	6,887	6,641	246
Minneapolis	45,375	39,128	6,247
Portland	24,497	20,274	4,223
Rochester	31,864	27,277	4,587
Cleveland	97,676	80,349	17,327
Milwaukee	57,276	51,519	5,757
San Francisco	42,539	37,532	5,007

With the material available in this study neither the method of control for testing the completeness of reporting measles resorted to by Sydenstricker,[1] and Sydenstricker and Hedrich[2] for Hagerstown experience, nor that of Green and Moorehouse[3] for Cleveland experience was applicable.

The estimate of completeness as calculated by Hedrich[4] on the basis of his paper (Corrected Average Attack Rate from Measles Among City Children) for 15 of the 32 cities of this study was kindly provided through personal correspondence so far as the experience of these cities with measles, 1918–1927, was concerned.

Table XIX shows in column A the percentage ratio of cases reported at all ages (1924–1933) to live births, and in column B the completeness of reporting as estimated by Hedrich for the same cities, 1918–1927.

It will be noted that by the Hedrich method a higher rating in probable completeness of reporting is given than the ratio of cases to live births in 11 of the cities and a lower rating in 4.

In the absence of any specific sampling tests, as of histories of measles in school children, or by checking deaths against reported cases, or similar methods of individual inquiry, a reasonable probability of the relative completeness of notification of measles can be given by comparing, for at least a 10 year period, the cases notified with

TABLE XIX

Measles

	A	B	
	Percentage of Reported Cases to Live Births 1924–1933	*Estimated Completeness of Reporting (Hedrick) 1918–1927*	*Differences Between the Two Sets of Estimates, i.e., from A to B*
Seattle	54.0	50	—4.0
Providence	37.4	43	+5.6
Newark	34.8	42	+7.2
New Haven	32.5	25	—6.5
Baltimore	30.9	34	+3.1
Boston	29.4	35	+5.6
Cleveland	29.1	22	—6.9
San Francisco	26.7	29	+2.3
Detroit	25.1	25	—0.1
Los Angeles	23.7	31	+7.3
Rochester	22.2	26	+3.8
Philadelphia	19.5	22	+2.5
Buffalo	19.2	23	+3.8
New York City	18.1	19	+0.9
Chicago	16.8	19	+2.2

live births reported over the same period, making allowance where necessary for individual demographic peculiarities of age and race in the communities studied.

Sydenstricker,[1] and Sydenstricker and Hedrich[2] found that 30.5 per cent of cases of whooping cough seen by physicians were reported and that only 16.8 per cent of all cases which actually occurred were reported.

Green and Moorehouse[3] stated that 78 per cent of deaths from whooping cough in Cleveland, 1923–1928, had been previously reported as cases.

Hedrich[4] offers a formula for esti-

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mating the probable degree of incompleteness of reporting of measles.

Percentage Ratio of Reported Cases to Births in Cities with a Higher Measles Incidence per 100,000 of All Ages in the Second than in the First Quinquennium

	1924–1928	1929–1933
Charleston	6.7	6.8
Racine	42.5	76.8
Minneapolis	14.5	40.8
Portland	17.7	24.3
Rochester	19.6	25.3
Cleveland	22.6	37.0
Milwaukee	29.3	63.8
San Francisco	19.3	35.1

When we study the case incidence of reported measles per 100,000 of the population at all ages in these same 8 cities we find that this rose to a greater or less degree in each city from the first to the second quinquennium.

Case Incidence per 100,000, All Ages

	1924–1928	1929–1933	Increase in Rate
Charleston	180.0	190.0	10.0
Racine	912.1	1,486.7	674.6
Minneapolis	304.0	673.0	369.0
Portland	302.8	321.1	18.3
Rochester	395.5	415.6	20.1
Cleveland	513.1	652.1	149.0
Milwaukee	622.8	1,108.8	486.0
San Francisco	279.8	405.5	125.7

San Francisco is the only city of this list for which we have incidence by age for each year, and it appears that in spite of very considerable reduction in births in the second as compared with the first quinquennium this city showed an increase in incidence, for each of the 4 age groups up to 15 years of age, (under 1, 1 year, 2 to 4, and 5 to 14). From this we can conclude that the increase in reported incidence of measles resulted in this city from more complete reporting of the disease in the second than in the first quinquennium. For the other 7 cities which showed an increase, the same explanation may be true since it is apparent that in each instance the ratio of cases to births rose in the second as compared with the first quinquennium, suggesting a rise in relative completeness of reporting in the face of a reduction in the presumed susceptibles in the community.

B. CASE FATALITY

There is little to be said on the subject of case fatality of measles as calculated for these cities in view of the evidence already presented that the reporting of cases of the disease has varied widely, and has rarely approached completeness. It can be taken for granted that deaths have been recorded with substantial completeness, and have been tabulated according to the *International List and Joint Cause Manual* by uniform registration practice as due to measles when so certified.

The case fatality rates will therefore be higher in cities where reporting of measles has been more incomplete and *vice versa*, unless there are other peculiarities in the experience of the various cities such as differences in age composition which would show a higher

TABLE XX

Measles

Case Fatality Per Cent in 31 Cities 1924–1933, All Ages

City	Case Fatality %	City	Case Fatality %
Albuquerque	1.8	Seattle	0.3
Berkeley	0.2	Washington	0.4
Charleston	2.6	Baltimore	0.6
East Orange	0.2	Boston	0.9
Madison	0.3	Buffalo	0.6
Racine	0.2	Chicago	0.7
Hartford	0.9	Cleveland	0.5
Kansas City, K.	0.4	Detroit	1.0
New Haven	0.2	Los Angeles	0.5
Syracuse	0.3	Los Angeles Co.	0.4
Birmingham	1.5	Milwaukee	0.2
Minneapolis	0.4	New York	1.2
Newark	0.5	Philadelphia	0.8
Portland	0.2	Pittsburgh	0.8
Providence	0.7	San Francisco	0.3
Rochester	0.7	All Cities	0.73

TABLE XXI

Case Fatality Per Cent for Measles, for All Cities for Which Records Were Available, for Each Age Group and Year Specified and Not in Each Year and Age for the Same Cities, in All Instances

	Under 1	*1–2*	*2–4*	*5–14*	*15 and Over*	*All Ages*
1924	5.0	4.4	0.6	0.09	0.2	1.2
1925	8.0	5.5	1.0	0.1	0.4	0.9
1926	9.8	5.6	1.05	0.15	0.5	1.2
1927	4.9	4.0	0.5	0.03	0.07	0.59
1923	6.4	4.1	0.7	0.22	0.4	0.84
1924–23	7.2	4.7	0.8	0.14	0.35	0.99
1929	4.2	3.4	0.7	0.1	0.1	0.59
1930	4.2	4.1	0.5	0.12	0.27	0.56
1931	3.7	2.3	0.4	0.09	0.24	0.48
1932	2.5	1.5	0.28	0.09	0.16	0.28
1933	2.0	1.6	0.36	0.11	0.16	0.43
1929–33	3.4	2.5	0.4	0.1	0.21	0.46
1924–33	5.1	3.6	0.58	0.12	0.28	0.73

1928, Syracuse is not included in report on age groups 5–14 and 15 and over, and there is no record of deaths from measles in Syracuse for these age groups.

1924–1933, Kansas City is not included for the age groups as deaths from measles were not available by age groups.

Case fatality rates are based on the experience of the cities listed for case incidence, with the above exceptions.

proportion of children in the age groups under 5 years, this to be expected to give a higher rate, or in a lower prevalence and severity of pneumonia because perhaps of favorable climatic conditions which might be expected to result in a lower case fatality rate particularly in young children.

The largest experience which can be assembled on case fatality per cents for the 32 cities is for the 10 year period for each of the 31 cities (Austin not reporting cases). These rates are not to be accepted as of equal significance for all cities because of lack of uniformity and completeness of reporting throughout the years.

When the case fatality is calculated for the 3 groups of cities A, B, and C (Table XV), selected according to probable relative completeness of reporting cases of measles, we find the composite rate of the 8 A cities (135,197,620 exposure years, 435,514 cases reported, and 4,232 deaths) to have been 0.97 per cent. In this group it will be recalled that reporting was of less than 1 case of measles for each 5 live births in the decennium.

The rate for the 14 B cities (89,709,623 exposure years, 465,138 cases reported, and 2,934 deaths) was 0.6 per cent. In these cities more than 1, but less than 2 cases were reported from each 5 live births.

The rate for the 8 C cities (14,196,546 exposure years, 125,900 cases reported and 354 deaths) was 0.3 per cent. In this group more than 2 cases of measles were reported for each 5 live births.

A more nearly exact experience is offered in Table XXI which records the composite rate for each age group and for the years separately and for the two quinquennia and the decennium, so far as these were available. It is to be noted that in a disease with such wide annual variations of incidence as measles, unless records are available for the years consecutively, we may have errors due to the chance that in only one omitted year the incidence may have been high or low. The special value

TABLE XXII

Measles

Case Fatality Per Cent in 8 Cities, 1924–1933

(Repeated from Table II)

	Under 1	*1–2*	*2–4*	*5–14*	*15 and Over*	*All Ages*
1924	6.9	4.3	0.6	0.1	0.2	0.8
1925	9.7	5.6	1.0	0.2	0.5	1.2
1926	7.9	5.5	0.8	0.05	0.2	0.9
1927	3.8	5.6	0.6	0.09	0.1	0.5
1928	8.7	3.7	0.7	0.2	0.3	0.8
1924–28	7.6	4.9	0.7	0.7	0.2	0.9
1929	3.9	3.7	0.7	0.3	0.0	0.7
1930	5.5	4.8	0.7	0.4	0.2	0.7
1931	1.9	1.6	0.3	0.3	0.2	0.3
1932	2.1	1.0	0.2	0.1	0.0	0.2
1933	1.8	1.4	0.3	0.2	0.2	0.2
1929–33	3.1	2.4	0.4	0.4	0.1	0.4
1924–33	5.7	3.9	0.6	0.6	0.2	0.6

The 8 cities were those only with records of cases and deaths for measles by the 5 age groups for all 10 years: Berkeley, Boston (except 1930 and 1932), East Orange, Los Angeles County, Newark, Pittsburgh, Providence, and San Francisco.

of this table is in the assembly of all the experience available for the individual years, for each age group, thus reducing appreciably the probable error of the age specific fatality rate for the particular age group and for the year.

The case fatality rates most nearly approaching the probable true expression of the disease are those from which case and death reports are available for each age group and for each of the 10 years (except for Boston for the years 1930 and 1932). Also it may be noted that 2 of these 8 cities are among those of Group C, and none is among those of Group A.

It will be noted that, whether we use the composite experience of all cities for which incidence and deaths are available by the particular age groups, though not necessarily for each of the 10 years, as given in Table XXI, or the experience of the 8 cities for which rates can be calculated for each age group and for each of the 10 years, as given in Table XXII, the case fatality per cent was lower in the second than in the first quinquennium in each age group, the drop in rate being greatest for children under 1 year and least for those from 5 to 14 years of age.

No attempt is offered to describe the part played by the increase in completeness of reporting, as compared with the effect which we might assume that better control and treatment of the disease have exerted upon specific age case fatality rates.

The drop in case fatality per cent for the population at all ages may in part be explained by the reduction in the per cent of persons living at the ages of special susceptibility to measles, *i.e.*, those under 5 years of age.

C. DEATH RATES

While much doubt may be properly cast upon the reliability of the reported case incidence, and consequently upon case fatality rates in the earlier sections of this study because of the relative incompleteness of reporting shown to have prevailed in the several cities, there is good reason to have faith in

TABLE XXIII

Death Rates from Measles per 100,000—Under 1 Year of Age

	1924	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930*	*1931*	*1932*	*1933*	*1929–33*	*1924–33*
Albuquerque	3,305.8	0	0	709.2	225.7	794.0	0	621.1	0	191.2	0	159.0	441.5
Berkeley	0	0	0	0	0	0	0	0	0	0	0	0	0
Charleston	....	0	0	0	0	....	0	0	580.8	0	0	116.2	116.2
East Orange	0	0	121.5	0	0	24.3	0	0	0	0	0	0	11.6
Madison	0	0	591.0	113.3	0	141.8	0	100.8	0	0	0	19.5	74.7
Racine	0	0	....	0	0	....	....	0	0	....	0	....	....
Hartford	142.4	0	145.4	0	74.3	72.7	37.5	0	230.2	0	0	53.7	63.5
New Haven	0	33.2	34.6	0	150.0	41.5	78.3	0	0	0	0	17.2	30.6
Syracuse	123.5	0	31.1	125.1	0	56.0	0	0	0	128.0	....	25.5	40.9
Birmingham	25.2	0	24.2	0	69.9	24.2	0	22.5	154.6	0	0	35.3	30.0
Minneapolis	0	0	134.6	0	15.1	29.9	0	15.3	15.4	0	0	18.5	24.3
Newark	49.5	37.9	219.5	0	148.3	90.4	0	56.4	0	0	30.3	17.3	55.9
Providence	0	68.1	397.0	0	346.4	158.8	127.5	26.3	54.3	224.8	0	87.0	125.6
Rochester	61.0	62.3	85.0	0	0	42.5	45.6	0	72.0	147.7	0	52.8	47.3
Seattle	145.5	0	21.4	43.4	22.0	47.1	0	45.4	0	23.4	0	13.8	31.1
Washington	15.4	15.4	155.1	0	46.9	46.5	0	0	15.8	0	0	3.2	25.1
Baltimore	36.5	14.9	205.2	15.5	150.4	83.6	0	8.3	177.5	0	0	37.2	61.6
Boston	136.0	300.3	102.1	48.1	139.0	146.1	16.7	85.3	17.4	26.7	45.6	38.3	95.0
Buffalo	20.4	185.6	31.3	0	95.8	66.7	0	0	88.0	0	33.7	24.2	46.0
Chicago	40.8	56.4	33.1	54.7	5.9	38.2	78.4	3.9	17.7	7.9	7.9	23.2	30.8
Cleveland	58.0	6.6	121.1	0	42.2	45.8	57.7	0	22.7	46.6	0	25.7	36.3
Detroit	44.2	23.5	310.5	26.2	157.6	113.5	25.1	98.3	6.9	50.5	36.3	43.3	76.5
Los Angeles Co.	89.1	0	37.0	68.2	10.6	39.5	0	64.5	17.8	0	16.7	19.7	28.0
Milwaukee	....	10.4	62.3	61.9	0	33.6	50.9	0	10.1	40.0	0	20.1	26.0
New York City	130.1	46.7	187.7	9.9	101.4	95.4	11.2	46.2	25.9	15.7	35.0	26.8	62.0
Pittsburgh	26.3	132.8	53.6	36.1	100.3	69.7	9.2	83.7	9.4	19.0	0	24.4	47.6
San Francisco	15.3	0	61.6	46.4	0	24.6	0	31.4	0	0	0	6.3	15.6

TABLE XXIII (Cont.)

Death Rates from Measles per 100,000—at 1 Year of Age

	1924	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930*	*1931*	*1932*	*1933*	*1929–33*	*1924–33*
Albuquerque	2,272.7	0	0	495.0	475.1	621.1	228.3	657.9	0	408.2	197.2	296.1	442.3
Berkeley	113.6	0	0	223.5	0	67.4	0	0	0	0	0	0	33.2
Charleston	....	0	0	0	0	0	88.7	0	541.5	0	0	126.4	126.4
East Orange	0	0	335.9	0	0	71.2	121.1	0	0	0	0	24.5	48.3
Madison	0	0	0	115.6	0	23.7	0	0	0	0	0	0	11.1
Racine	0	0	0	0	0	....	0	0	0	0	0	0	0
New Haven	31.4	32.4	0	0	250.2	60.1	0	0	0	0	0	0	32.7
Syracuse	61.7	0	31.1	187.7	219.9	99.6	0	31.7	0	64.0	0	19.1	59.8
Birmingham	169.6	0	79.9	51.8	75.6	74.6	0	47.8	209.6	0	0	51.2	62.1
Minneapolis	57.2	28.9	160.8	14.8	29.9	58.5	60.5	0	0	0	31.8	18.6	39.1
Newark	117.7	40.1	478.5	28.0	286.5	188.7	14.7	75.2	15.4	0	65.1	34.0	116.0
Providence	22.3	136.0	599.1	0	285.9	207.4	169.7	0	50.2	153.4	0	75.3	144.2
Rochester	56.8	58.7	141.6	0	21.7	56.6	90.0	0	48.7	101.5	0	48.7	53.0
Seattle	278.7	0	22.4	23.0	47.1	76.3	72.5	49.6	0	0	0	25.4	52.5
Washington	32.1	0	95.7	0	79.3	41.5	0	15.8	15.7	0	15.6	9.4	25.3
Baltimore	109.4	23.6	246.7	8.0	210.8	119.4	0	0	158.6	8.4	0	33.4	77.4
Boston	125.5	299.0	159.0	176.5	155.5	183.3	15.8	111.9	56.7	....	25.0	52.5	127.4
Buffalo	19.8	140.7	10.2	10.4	94.8	55.1	21.4	32.6	132.7	0	22.9	42.0	48.8
Chicago	56.4	75.8	38.2	84.6	15.5	54.2	101.4	7.9	41.6	12.0	10.0	34.8	44.7
Cleveland	....	25.7	296.4	0	13.9	85.1	121.8	0	22.8	117.9	0	53.3	68.5
Detroit	99.6	22.6	342.0	22.0	209.4	139.8	39.2	154.5	0	71.7	40.4	60.9	99.0
Los Angeles Co.	104.1	27.0	49.6	183.2	10.6	74.4	0	149.0	27.0	0	67.5	48.9	59.6
Milwaukee	....	10.8	96.9	10.8	0	29.6	118.3	0	21.5	21.5	0	32.2	31.1
New York City	234.6	52.3	294.1	14.0	150.5	149.4	8.5	51.7	45.4	16.6	68.9	38.1	95.0
Pittsburgh	41.6	293.4	67.6	162.0	137.6	140.3	34.7	140.1	35.3	35.7	0	49.5	95.9
San Francisco	61.1	0	61.6	15.5	0	27.7	31.2	62.7	0	0	0	18.9	23.4

(Continued on next page)

TABLE XXIII (Cont.)

Death Rates from Measles per 100,000—2–4 Years of Age

	1924	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930*	*1931*	*1932*	*1933*	*1929–33*	*1924–33*
Albuquerque	1,105.0	0	0	0	286.9	264.6	0	199.6	0	0	60.0	51.4	147.8
Berkeley	74.9	0	0	0	0	14.3	0	0	0	0	0	0	6.7
Charleston	0	0	0	0	0	....	0	26.8	80.5	0	26.8	26.8	26.8
East Orange	0	0	0	0	121.2	24.1	0	0	0	0	0	0	12.1
Madison	0	0	75.4	36.6	0	22.6	34.5	100.8	32.7	0	31.0	39.2	31.5
Racine	....	0	....	0	0	....	....	0	....	....	....	....	....
New Haven	0	22.4	22.0	0	35.2	15.4	0	0	26.0	0	0	5.2	10.7
Syracuse	40.8	0	10.2	41.1	20.6	22.5	0	0	0	20.8	0	4.1	13.4
Birmingham	50.9	0	39.5	7.6	29.6	25.3	0	6.9	80.9	0	0	17.5	21.1
Minneapolis	9.2	0	41.6	4.6	4.6	12.0	14.0	18.6	0	0	18.8	10.3	11.1
Newark	7.8	8.0	61.1	4.2	42.4	24.5	0	26.6	0	4.6	33.1	12.7	18.9
Providence	0	37.7	137.1	0	54.3	45.7	46.9	0	0	8.0	0	11.2	28.8
Rochester	6.0	0	25.1	0	13.2	8.8	20.2	0	28.4	58.2	0	21.3	14.6
Seattle	50.0	0	0	21.8	7.3	15.9	14.7	14.7	0	29.8	0	11.9	13.9
Washington	0	0	62.4	0	20.4	16.6	0	0	14.8	4.9	9.7	5.9	11.2
Baltimore	7.3	9.8	86.0	4.9	32.1	28.0	0	0	32.3	0	0	6.5	17.3
Boston	17.1	74.0	49.9	25.2	63.8	45.9	7.7	52.2	13.2	....	5.4	19.7	34.6
Buffalo	0	32.8	3.3	0	30.2	13.2	0	0	13.8	3.5	0	3.4	8.4
Chicago	7.9	21.5	6.8	17.5	6.3	12.0	31.1	0.6	11.0	11.7	5.3	12.0	12.0
Cleveland	....	0	77.4	0	6.6	21.2	15.7	2.3	11.8	19.5	0	9.9	15.2
Detroit	19.3	1.2	91.0	4.7	48.2	33.2	6.7	31.6	0	5.2	12.1	11.0	21.4
Los Angeles Co.	18.7	4.2	3.8	38.9	0	13.1	0	28.4	0	0	12.9	8.3	10.3
Milwaukee	....	10.8	15.0	0	0	7.2	17.9	0	3.6	28.7	0	10.0	8.8
New York City	37.2	11.0	65.5	5.3	25.1	28.8	2.6	11.4	9.7	4.1	19.7	9.5	19.2
Pittsburgh	5.4	59.9	24.6	22.0	25.0	27.4	5.6	14.0	8.5	19.9	5.7	10.7	19.2
San Francisco	40.8	0	10.2	10.2	5.1	13.2	5.1	15.2	10.1	0	0	6.1	9.6

TABLE XXIII (Cont.)

Death Rates from Measles per 100,000—5–14 Years of Age

	1924	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930*	*1931*	*1932*	*1933*	*1929–33*	*1924–33*
Albuquerque	51.7	24.5	0	0	21.2	18.6	0	19.5	0	18.2	0	7.5	12.5
Berkeley	10.0	0	0	9.2	0	3.8	0	8.6	8.4	8.2	0	5.0	4.4
Charleston	....	0	0	0	0	....	0	0	32.2	0	0	6.4	6.4
East Orange	0	0	0	0	45.8	9.4	0	11.2	0	0	21.5	6.6	8.0
Madison	0	0	25.3	12.2	0	7.6	11.5	33.4	0	0	0	8.6	8.2
Racine	0	0	....	0	0	....	....	0	....	....	....	....	....
Hartford	0	0	0	0	0	2.3	0	0	0	0	0	0	1.1
New Haven	0	3.2	0	0	0	0.6	0	0	0	0	0	0	0.3
Birmingham	12.5	0	14.2	0	8.9	7.1	0	0	6.2	0	3.9	2.1	4.4
Minneapolis	1.5	3.0	13.0	0	0	3.5	6.7	1.3	2.6	0	3.7	2.8	3.1
Newark	1.2	0	2.4	0	7.3	2.2	0	3.6	0	1.2	3.6	1.7	1.9
Providence	0	2.2	4.4	0	6.5	2.7	6.5	0	0	6.3	0	2.5	2.6
Rochester	0	0	5.6	0	3.6	1.9	0	0	3.5	10.4	1.7	3.2	2.5
Seattle	14.7	0	0	4.0	5.9	4.9	0	1.9	1.9	16.8	0	4.2	4.5
Washington	0	4.7	7.7	0	4.5	3.4	0	0	8.7	0	1.4	2.0	2.7
Baltimore	1.5	0.7	8.1	0.7	4.6	3.1	0.7	0	6.3	0	0	1.4	2.2
Boston	0.8	2.3	3.9	0.8	4.6	2.5	0	5.3	0.8	0.8	0	1.4	1.9
Buffalo	0	7.2	2.0	0	3.9	2.6	0	0	1.9	1.9	0	0.8	1.7
Chicago	0.1	1.9	1.5	3.7	0.5	1.7	3.6	0	2.5	0.9	2.6	1.9	1.8
Cleveland	1.3	0	3.8	0.6	1.8	1.5	5.5	0.6	1.8	6.4	0	2.8	2.2
Detroit	1.0	0.9	13.2	0.4	6.2	4.4	1.8	4.9	0	1.3	4.1	2.4	3.3
Los Angeles Co.	4.0	1.2	0	6.1	0	2.2	0	4.1	2.4	0	4.4	2.2	2.2
Milwaukee	....	0	0	1.1	0	0.3	4.2	0	6.1	6.0	0	3.2	2.0
New York	3.2	0.8	5.6	0	3.0	2.5	0.4	2.0	2.3	0.9	3.3	1.8	2.2
Pittsburgh	1.7	8.5	0.8	1.7	4.9	3.5	1.6	3.2	3.2	0	0	1.6	2.5
San Francisco	1.4	0	0	4.2	0	1.1	0	5.4	1.3	1.3	0	1.6	1.4

(Continued on next page)

TABLE XXIII (Cont.)

Death Rates from Measles per 100,000—15 Years of Age and Over

	1924	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930*	*1931*	*1932*	*1933*	*1929–33*	*1924–33*
Albuquerque	0	0	0	0	0	0	0	0	0	0	0	0	0
Berkeley	0	0	0	0	0	0	0	0	0	0	0	0	0
Charleston	....	0	0	0	0	0	0	0	4.6	0	0	0.9	0.9
East Orange	0	0	0	0	0	0	0	0	0	0	0	0	0
Madison	0	2.7	0	0	0	0.5	0	2.2	0	0	0	0.4	0.5
Hartford	0	0	0	0	0	0	0	0	0	0	0	0	0
New Haven	0	0	0	0	0	0	0	0	0	0	0	0	0
Birmingham	4.5	0	1.8	0	1.1	1.4	0.5	0	0.5	0	0	0.2	0.8
Minneapolis	0	0	0.3	0.3	0.6	0.2	0	0	0	0	0.3	0.1	0.1
Newark	0	0.3	0	0	0	0.1	0	0.3	0	0	0.3	0.1	0.1
Providence	0	0.6	0	0	0	0.1	0	0	0	0	0	0	0.1
Rochester	0.9	0	0	0	0.4	0.3	0	0	0.4	0.8	0	0.2	0.2
Seattle	0	0	0	0	0	0	0	0	0	0	0	0	0
Washington	0	0	0.3	0	0.5	0.2	0	0	0.3	0	0	0.1	0.1
Baltimore	0.2	0	0.3	0	0	0.1	0	0.2	0	0	0	±	0.1
Boston	0.2	0.2	0.2	0	0.5	0.2	0	0	0	0	0	±	0.1
Buffalo	0	0.3	0.2	0.2	0	0.1	0.2	0	0	0	0	±	0.1
Chicago	0.1	0.09	0.09	0.1	0	0.9	0.2	0.8	0.8	0.4	0.4	0.8	0.8
Cleveland	0	0.2	0.2	0	0	0.1	0.2	0	0	0	0	±	±
Detroit	0.1	0.1	1.1	0	0.4	0.3	0	0.3	0	0	0	0.1	0.2
Los Angeles Co.	0	0	0	0.2	0	±	0	0	0.2	0	0	±	±
New York	*	0.1	0.2	0	0.1	0.1	*	*	*	*	0.1	±	0.1
Pittsburgh	0.2	0.2	0.2	0	0	0.1	0	0	0	0	0	0	0.1
San Francisco	0	0	0	0	0	0	0	0	0	0	0	0	0

* Less than 0.1 per 100,000.

TABLE XXIII (Cont.)

Death Rates from Measles—All Ages

	1924	1925	1926	1927	1928	1924–28	1929	1930	1931	1932	1933	1929–33	1924–33
Albuquerque	173.5	4.7	0.0	21.3	32.5	43.8	3.9	37.2	0.0	13.8	6.6	12.2	26.2
Austin	....	....	....	2.1	18.0	10.2	0	0	0.0	1.8	0.0	0.4	2.9
Berkeley	5.9	0.0	0.0	4.0	0.0	1.9	0	1.2	1.2	1.1	0.0	0.7	1.3
Charleston	9.2	0.0	0.0	0.0	0.0	1.9	1.6	1.6	34.1	0.0	1.7	7.8	4.8
East Orange	0.0	0.0	6.5	0.0	10.8	3.6	1.5	1.5	0.0	0.0	2.7	1.1	2.3
Madison	0.0	2.0	17.7	7.6	0.0	5.5	3.5	13.7	1.7	0.0	1.6	4.0	4.7
Racine	0.0	0.0	10.9	0.0	0.0	2.2	12.0	0.0	0.0	1.4	0.0	2.6	2.4
Hartford	6.0	0.0	7.1	1.9	7.5	4.5	2.5	1.8	5.4	0.0	0.0	2.0	3.2
Kansas City	....	....	....	....	....	....	1.7	0.8	3.2	0.0	3.1	1.8	1.8
New Haven	0.6	3.1	1.8	0.0	8.6	2.8	1.2	0.0	1.2	0.0	0.0	0.5	1.7
Syracuse	5.8	0.0	2.0	7.0	4.9	4.0	0.0	0.5	0.0	5.1	0.0	1.1	2.5
Birmingham	11.7	0.0	7.8	1.3	6.5	5.4	0.4	1.5	11.9	0.0	0.7	2.9	4.0
Minneapolis	1.7	0.9	9.0	0.7	1.3	2.7	2.6	1.3	0.6	0.0	2.9	1.5	2.1
Newark	3.7	2.1	16.0	0.7	10.7	6.7	0.2	4.3	0.2	0.4	3.8	1.8	4.2
Portland	0.7	0.0	0.0	1.7	1.0	0.7	2.3	0.7	0.0	0.0	0.3	0.7	0.7
Providence	0.4	6.5	25.5	0.0	14.4	9.4	8.3	0.4	1.6	7.0	0.0	3.5	6.4
Rochester	2.9	1.9	5.7	0.0	1.9	2.5	2.8	0.0	3.6	7.8	0.3	2.9	2.7
Seattle	10.1	0.0	0.6	2.3	2.0	2.9	1.4	1.9	0.3	3.7	0.0	1.5	2.2
Washington	0.7	0.9	7.3	0.0	3.6	2.5	0.0	0.2	2.4	0.2	0.8	0.7	1.6
Baltimore	3.3	1.3	13.6	0.8	8.1	5.4	0.1	0.2	7.6	0.1	0.0	1.6	3.5
Boston	5.8	14.8	7.8	5.2	9.2	8.5	0.9	6.5	1.9	1.0	1.3	2.3	5.4
Buffalo	0.7	9.2	1.5	0.4	5.5	3.5	0.5	0.5	4.5	0.5	0.8	1.4	2.4
Chicago	2.4	3.8	1.9	3.8	0.7	2.5	5.0	0.3	1.8	1.0	0.9	1.8	2.1
Cleveland	2.4	0.7	12.4	0.1	1.6	3.4	4.7	0.2	1.5	4.3	0.0	2.1	2.8
Detroit	4.4	1.2	21.4	1.3	11.1	8.0	1.9	7.5	0.1	2.7	2.7	3.0	5.2
Los Angeles	1.7	0.2	0.5	4.1	0.4	1.4	0.3	3.4	1.0	0.1	3.0	1.6	1.5
Los Angeles Co.	4.4	0.8	1.5	6.8	0.3	2.7	0.0	5.2	1.2	0.0	2.6	1.8	2.2
Milwaukee	0.2	1.0	3.0	1.5	0.0	1.3	4.4	0.0	1.7	3.5	0.0	1.9	1.6
New York	9.0	2.5	12.5	0.7	5.8	6.0	0.5	2.3	1.9	0.8	2.9	1.7	3.8
Philadelphia	1.5	4.0	8.4	0.2	7.8	4.4	0.5	0.8	5.5	0.1	1.7	1.7	3.0
Pittsburgh	2.1	13.1	3.9	5.1	6.4	6.1	1.4	5.1	1.8	1.9	0.3	2.1	4.0
San Francisco	2.5	0.0	1.7	1.5	0.2	1.2	0.5	2.2	0.5	0.2	0.0	0.6	4.9

the probable validity of the death rates because of the reasonable accuracy of population estimates, and the high probability of completeness and uniformity in reporting and classifying as measles deaths all those properly attributable to this cause.

Therefore, we may with greater confidence use death rates per 100,000 at specified ages and for persons at all ages, as a basis of comparison of the relative effectiveness of administrative measures intended for the control of measles than we have found safe in reference to incidence and case fatality rates.

The death rates from measles for those cities separately and for each year for the selected age groups for which data were obtainable are given in Table XXIII.

It will be seen that the death rates for children under 1 year of age were less in 23 of the 27 cities in the second than in the first quinquennium, Birmingham and Rochester having higher rates for the second than for the first quinquennium and Berkeley reporting no mortality under age 1 year for any one of the 10 years. For the 27 cities as a group, the drop in the age specific death rate under 1 was from 75.8 to 25.1.

The death rates for children at 1 year of age were less in the second than in the first quinquennium in 25 of the 27 cities for which data are available, Charleston and Milwaukee alone reporting higher rates.

For the 27 cities as a group the drop in the age specific death rate in children at 1 year of age was from 112.7 to 40.4.

Twenty-two out of 26 cities showed lower, and 4 (Charleston, Madison, Milwaukee, and Rochester) showed higher death rates for children at 2 to 4 years of age in the second than in the first quinquennium. For the 26 cities as a group, the drop in the age specific death rate in children from 2 to 4 was from 24.1 to 10.4.

Sixteen of 26 cities showed lower, and 8 (Berkeley, Charleston, Madison, Rochester, Cleveland, Chicago, Milwaukee, and San Francisco) showed higher death rates for children 5 to 14 years of age in the second than in the first quinquennium, and 1 city, Los Angeles County, showed identical rates in the two periods. For the 26 cities as a group, the age specific death rate for children of 5 to 14 years of age in the first quinquennium was 2.8 and in the second 2.1.

The age specific death rates for persons 15 years and over are too low to offer differences of any significance. For the 26 cities as a group, this rate for 1924–1928 was 0.1 and for 1929–1933 was 0.04, involving in the first instance 92, and in the second only 42 deaths.

The death rates for persons at all ages attributed to measles in the 31 cities for which data were available for both quinquennia were lower in 25 cities, were higher in 5 cities, Charleston, Racine, Rochester, Los Angeles, and Milwaukee) in the second than in the first quinquennium, and remained the same in 1 city (Portland). For the 31 cities (Austin omitted because of lack of records) as a group in the first quinquennium, the death rate from measles for persons at all ages was 4.6, and for the 32 cities it was 1.8 in the second quinquennium.

The summary Table XXIV gives the death rates for measles for the cities combined, by age group, and by years.

The death rates from measles for those 8 cities for which records were available for each of the cities for each year, and for persons in the 5 age groups and at all ages are given in Table XXV. For each age group the rate in the second quinquennium is less than that in the first, and for per-

TABLE XXIV

Age Specific Death Rates for Measles per 100,000 for All Cities Reporting by the Particular Age Groups—1924–1933

	Under 1 26 Cities	*1 to 2 25 Cities*	*2 to 4 25 Cities*	*5–14 24 Cities*	*15 & Over 23 Cities*	*All Ages All Cities (Ex. Austin)*
1924	80.1	138.0	23.4	2.3	0.1	4.7
1925	53.7	67.2	15.1	1.6	0.1	3.2
1926	139.5	201.3	48.6	5.4	0.3	8.6
1927	26.1	45.1	9.3	0.7	0.01	1.8
1928	80.0	113.7	23.8	3.6	0.6	4.8
1924–28	75.8	112.7	24.1	2.8	0.1	4.6
1929	26.9	41.6	9.6	1.2	0.04	1.7
1930	37.6	53.6	12.6	2.3	0.07	2.2
1931	32.6	44.4	10.1	2.5	0.06	2.2
1932	22.3	26.8	8.0	1.9	0.03	1.2
1933	20.9	34.9	11.1	2.3	0.03	1.7
1929–33	28.1	40.4	10.4	2.1	0.04	1.8
1924–33	52.1	76.9	17.2	2.4	0.09	3.1

sons of all ages the death rate fell from 5.4 to 1.9.

It is of further interest to consider changes in death rates for persons of all ages and in particular age groups according to the presumed completeness of reporting of measles as measured by the ratio of cases reported to live births in the community.

From Table XXVI, the death rates for persons at all ages, and for the age groups under 5 years, 5 to 14 years, and 15 and over, for the decade and the two quinquennia can be studied for each of the 3 classes of cities referred to in Sections A and B of this chapter, viz:

A. Eight cities reporting less than 1 case of measles for each 5 live births; B. Fourteen cities reporting more than 1 but less than 2 cases of measles for each 5 live births; and C. Eight cities reporting 2 or more cases of measles for each 5 live births.

TABLE XXV

Age Specific Death Rates for Measles per 100,000 for 8 Cities, by Years, for Which Records Are Available Each Year—1924–1933*

	Under 1	*1 to 2*	*2 to 4*	*5–14*	*15 & Over*	*All Cities*
1924	61.3	83.4	15.3	1.6	0.8	3.5
1925	114.8	162.7	36.6	2.7	0.2	6.9
1926	116.7	190.6	39.1	1.8	0.07	7.1
1927	36.3	118.6	19.2	2.3	0.03	3.7
1928	101.4	103.3	32.8	4.3	0.1	5.9
1924–28	86.5	137.0	28.6	2.6	0.09	5.4
1929	15.2	31.8	7.1	0.8	0	1.2
1930	81.3	134.2	33.5	5.3	0.09	5.5
1931	13.3	31.7	5.9	1.6	0.04	1.2
1932	24.2	24.0	6.7	1.2	0	1.1
1933	17.1	27.8	9.2	1.7	0.03	1.3
1929–33	28.0	46.0	11.7	2.0	0.03	1.9
1924–33	58.5	93.8	20.4	2.3	0.06	3.7

* Berkeley, Boston (Exc. in 1930 and 1932), East Orange, Los Angeles County, Newark, Pittsburgh, Providence, and San Francisco.

TABLE XXVI

Death Rates from Measles for All Ages and for 5 Age Groups per 100,000 of Corresponding Populations for the 32 Cities Grouped According to Relative Completeness of Reporting of Measles Cases in the Two Quinquennia and for the Decennium as a Whole

	All Ages			*Under 1*			*1 to 2*			*2 to 4*			*5 to 14*			*15 and Over*		
City	*1924–1928*	*1929–1933*	*1924–1933*	*1924–1928*	*1929–1933*	*1924–1933*	*1924–1928*	*1929–1933*	*1924–1933*	*1924–1928*	*1929–1933*	*1924–1933*	*1924–1928*	*1929–1933*	*1924–1933*	*1924–1928*	*1929–1933*	*1924–1933*
Group A (Poor Reporting)																		
Philadelphia	4.4	1.7	3.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Washington	2.5	0.7	1.6	46.5	3.2	25.1	41.5	9.4	25.3	16.6	5.9	11.2	3.4	2.0	2.7	0.2	0.1	0.1
Buffalo	3.5	1.4	2.4	66.7	24.2	46.0	55.1	22.9	48.8	13.2	3.4	8.4	2.6	0.8	1.7	0.1	±	0.1
New York City	6.0	1.7	3.8	95.4	26.8	62.0	149.4	38.1	95.0	28.8	9.5	19.2	2.5	1.8	2.2	0.1	±	0.1
Chicago	2.5	1.8	2.1	38.2	23.2	30.8	54.2	34.8	44.7	12.0	12.0	12.0	....	....	....	....	....	....
Hartford	4.5	2.0	3.2	72.7	53.7	63.5	....	....	....	....	....	....	2.3	8.6	8.2	0	0	0
Birmingham	5.4	2.9	4.0	24.2	35.3	30.0	74.6	51.2	62.1	25.3	17.5	21.1	7.1	2.1	4.4	1.4	0.2	0.8
Charleston	1.9	7.8	4.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
All 8 cities	4.6	1.7	3.2	73.3	25.3	49.8	111.3	36.6	74.6	22.7	10.0	16.4	2.7	1.6	2.2	0.1	0.04	0.08
Group B (Fair Reporting)																		
Providence	9.4	3.5	6.4	346.4	87.0	125.6	169.7	75.3	144.2	45.7	11.2	28.8	2.7	2.5	2.6	0.1	0	0.1
Newark	6.7	1.8	4.2	90.4	17.3	55.9	188.7	34.0	116.0	24.5	12.7	18.9	2.2	1.7	1.9	0.1	0.1	0.1
New Haven	2.8	0.5	1.7	41.5	17.2	30.6	60.1	0	32.7	15.4	5.2	10.7	0.6	0	0.3	0	0	0
Los Ang. Co.	2.7	1.8	2.2	39.5	19.7	28.0	74.4	48.9	59.6	13.1	8.3	10.3	2.2	2.2	2.2	±	±	±
Baltimore	5.4	1.6	3.5	83.6	37.2	61.6	119.4	33.4	77.4	28.0	6.5	17.3	3.1	1.4	2.2	0.1	±	0.1
Boston	8.5	2.3	5.4	146.1	38.3	95.0	183.3	52.5	127.4	45.9	19.7	34.6	2.5	1.4	1.9	0.2	0	0.1
Cleveland	3.4	2.1	2.8	45.8	25.7	36.3	85.1	53.3	68.5	21.2	9.9	15.2	1.5	2.8	2.2	0.1	±	±
Minneapolis	2.7	1.5	2.1	29.9	18.5	24.3	58.5	18.6	39.1	12.0	10.3	11.1	3.5	2.8	3.1	0.2	0.1	0.1
S. Francisco	1.2	0.6	0.9	24.6	6.3	15.6	27.7	18.9	23.4	13.2	6.1	9.6	1.1	1.6	1.4	0	0	0
Detroit	8.0	3.0	5.2	113.5	43.3	76.5	139.8	60.9	99.0	33.2	11.0	21.4	4.4	2.4	3.3	0.3	0.1	0.2
Pittsburgh	6.1	2.1	4.0	69.7	24.4	47.6	140.3	49.5	95.9	27.4	10.7	19.2	3.5	1.6	2.5	0.1	0	0.1
Los Angeles	1.4	1.6	1.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Rochester	2.5	2.9	2.7	42.5	52.8	47.3	56.6	48.7	53.0	8.8	21.3	14.6	1.9	3.2	2.5	0.3	0.2	0.2
Portland	0.7	0.7	0.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
All 13 cities	4 7	2.0	3.3	82.0	32.6	56.7	146.6	47.7	84.4	26.8	10.9	18.7	2.7	2.1	2.4	0.15	0.04	0.09
Group C (Best Reporting)																		
East Orange	3.6	1.1	2.3	24.3	0	11.6	71.2	24.5	48.3	24.1	0	12.1	9.4	6.6	8.0	0	0	0
Berkeley	1.9	0.7	1.3	0	0	0	67.4	0	33.2	14.3	0	6.7	3.8	5.0	4.4	0	0	0
Racine	2.2	2.6	2.4	0	0	0	0	0	0	0	0	0	....	....	....	....	....	....
Albuquerque	43.8	12.2	26.2	794.0	159.0	441.5	621.1	296.1	442.3	264.6	51.4	147.8	18.6	7.5	12.5	0	0	0
Seattle	2.9	1.5	2.2	47.1	13.8	31.1	76.3	25.4	52.5	15.9	11.9	13.9	4.9	4.2	4.5	0	0	0
Madison	5.5	4.0	4.7	141.8	19.5	74.7	23.7	0	11.1	22.6	39.2	31.5	7.6	8.6	8.2	0.5	0.4	0.5
Milwaukee	1.3	1.9	1.6	33.6	20.1	26.0	29.6	32.2	31.1	7.2	10.0	8.8	0.3	3.2	2.0	....	....	....
Syracuse	4.0	1.1	2.5	56.0	25.5	40.9	99.6	19.1	59.8	22.5	4.1	13.4	....	....	....	....	....	....
All 9 cities	3.1	1.9	2.5	76.8	20.9	39.7	69.8	31.7	55.3	20.0	11.1	15.3	3.4	4.2	3.8	0.05	0.04	0.05

If the differences between the death rates of the first quinquennium and those of the second are expressed in percentage of the former for each city and by Groups A, B, and C, we can see from Table XXVII that the percentage reductions are less for the Group C cities as a whole than for either of the other groups, with the exception of the differences in rates for children under 1 year of age and those between 5 and 14.

We may properly assume that since, as has already been shown, the death rates of the Group C cities were generally lower than those of the cities of the other groups in the first quinquennium, a further reduction was not so likely to occur in these cities by improved administrative measures or for other reasons, as would be expected in cities where less complete reporting and apparently less effective protective measures had in the first quinquennium been accompanied by relatively high death rates.

With the foregoing tables in mind it is worth noting that death rates are lower in the second than in the first quinquennium, quite generally for cities of each group classified according to relative completeness of reporting of measles, and also for each age group as well as for persons at all ages.

It is apparent that there is no consistent superiority, on the basis of death rates, of the cities with the more complete reporting of the disease over the cities where reporting was less complete.

Without further inquiry than the time and method of this study permitted, no adequate explanation for the exceptionally high death rates in Albuquerque can be offered. It may be noted, however, that Albuquerque is one of the 32 cities without any visiting or public health nursing service.

TABLE XXVII

Death Rates from Measles for the 3 Groups of Cities for All Ages and 5 Age Groups in the First and Second Quinquennia with Differences Expressed as Percentages ± of the Rate of the First Period

		Group A (8 Cities)	*Group B (14 Cities)*	*Group C (8 Cities)*
All ages	1924–28	4.6	4.9	3.1
	1929–33	1.7	2.0	1.9
	Per cent of change	—63.0	—57.2	—38.7
Under 1	1924–28	73.3	82.0	76.8
	1929–33	25.3	31.6	20.9
	Per cent of change	—69.6	—61.4	—72.8
1–2	1924–28	111.3	146.6	69.8
	1929–33	36.6	47.7	31.7
	Per cent of change	—67.1	—67.4	—54.7
2–4	1924–28	22.7	26.8	20.0
	1929–33	10.0	10.9	11.1
	Per cent of change	—56.0	—59.7	—46.5
5–14	1924–28	2.7	2.7	3.4
	1929–33	1.4	2.1	4.2
	Per cent of change	—40.7	—22.2	+21.0
15 and over	1924–28	0.1	0.15	0.05
	1929–33	0.04	0.04	0.04
	Per cent of change	—60.0	—60.0	—20.0

Seven cities had measles death rates (all ages) below 2.0 per 100,000. (In Group A, Washington 1.6; Group B, New Haven 1.7, San Francisco 0.9, Los Angeles City 1.5, and Portland 0.7; Group C, Berkeley 1.3 and Milwaukee 1.6).

The low rate in Washington cannot be explained by any particular superiority in character or quantity of control measures reported by the health officer of that city. It may be that the explanation is to be found in the age distribution of the population of this city which contains a lower per cent of children under 1, 1 to 2, 2 to 4, and 5 to 14 years of age, than is the case in the 32 cities as a whole, or in New York City, for example, as will be seen from reference to Table XXVIII.

The low rates for San Francisco, Los Angeles City, Portland, and Berkeley, may be related to the well known low pneumonia incidence and mortality among children of the west coast cities, pneumonia being the complication to which death is most commonly due when it occurs during the course of, or following measles. Also the relatively low percentage of children in these cities

TABLE XXVIII

Percentage Distribution of Population in 32 Cities Separately and as a Group 1930 Population

	Under 1	*1–2*	*2–4*	*5–14*	*15 and Over*
Albuquerque	1.8	1.7	5.6	19.1	71.9
Austin	1.7	1.5	4.9	16.8	75.1
Baltimore	1.5	1.5	5.0	17.6	74.4
Berkeley	1.1	1.1	3.7	14.1	80.0
Birmingham	1.7	1.6	5.5	18.1	73.1
Boston	1.5	1.6	4.9	16.8	75.1
Buffalo	1.6	1.6	5.1	18.1	73.5
Charleston	1.7	1.8	6.0	20.0	70.5
Chicago	1.5	1.5	4.5	16.5	76.0
Cleveland	1.5	1.5	4.8	18.5	73.9
Detroit	1.8	1.8	5.8	17.9	72.7
East Orange	1.3	1.2	3.6	13.1	80.8
Hartford	1.6	1.6	5.0	17.4	74.4
Kansas City, K.	1.7	1.6	5.4	18.9	72.4
Los Angeles	1.2	1.2	3.9	13.3	80.4
Los Angeles Co.	1.5	1.5	4.8	16.8	75.4
Madison	1.7	1.6	5.1	15.4	76.2
Milwaukee	1.7	1.6	4.8	16.7	75.2
Minneapolis	1.4	1.4	4.6	16.3	76.3
Newark	1.6	1.5	5.1	18.8	73.0
New Haven	1.5	1.6	4.9	19.3	72.7
New York	1.4	1.5	4.9	16.7	75.5
Philadelphia	1.4	1.4	4.8	17.3	75.1
Pittsburgh	1.4	1.7	5.3	18.5	72.9
Portland	1.0	1.1	3.6	14.3	80.0
Providence	1.5	1.6	5.0	18.5	73.4
Racine	1.9	1.7	5.6	18.5	72.3
Rochester	1.3	1.3	4.4	17.1	75.9
San Francisco	1.0	1.0	3.1	11.6	83.3
Seattle	1.2	1.1	3.7	14.2	79.8
Syracuse	1.5	1.5	4.6	17.0	75.4
Washington	1.3	1.3	4.1	14.0	79.3
Total all cities	1.4	1.5	4.8	16.6	75.6

TABLE XXIX

Case Incidence, Case Fatality, and Death Rates from Measles at All Ages, for the Decade 1924–1933, in Cities of Groups A, B, and C

	Case Incidence per 100,000	*Case Fatality Per Cent*	*Death Rate per 100,000*
Group A (8 cities)			
Pop. 135,197,620			
Cases 435,514	322.1	0.97	3.2
Deaths 4,232			
Philadelphia	364.7	0.8	3.0
Washington	376.9	0.4	1.6
Buffalo	394.5	0.6	5.4
New York City	323.7	1.2	3.8
Chicago	287.9	0.7	2.1
Hartford	347.2	0.9	3.8
Birmingham	234.9	1.5	4.0
Charleston	184.9	2.6	4.8
Group B (14 cities)			
Pop. 89,709,623			
Cases 465,138	518.4	0.6	3.3
Deaths 2,934			
Providence	826.7	0.7	6.4
Newark	783.7	0.5	4.2
New Haven	696.3	0.2	1.7
Los Angeles Co.	506.2	0.4	2.2
Baltimore	600.1	0.6	3.5
Boston	622.3	0.9	5.4
Cleveland	584.6	0.5	2.8
Minneapolis	496.8	0.4	2.1
San Francisco	345.8	0.3	0.9
Detroit	516.3	1.0	5.2
Pittsburgh	533.4	0.8	4.0
Los Angeles	328.1	0.5	1.5
Rochester	405.8	0.7	2.7
Portland	312.3	0.2	0.7
Group C (8 cities)			
Pop. 14,196,546			
Cases 125,900	886.7	0.29	2.5
Deaths 354			
East Orange	989.0	0.2	2.3
Berkeley	791.7	0.2	1.3
Racine	1,208.9	0.2	2.4
Albuquerque	1,434.2	1.8	26.2
Seattle	752.8	0.3	2.2
Madison	1,345.3	0.3	4.7
Milwaukee	878.5	0.2	1.6
Syracuse	852.6	0.3	2.5

is worth noting in comparison with such percentages in the 32 cities as a group, or in the large urban populations in Eastern and North Central United States.

In New Haven it may be suggested that the especially favorable ratio of nurses to population and the consistent medical and nursing follow-up and care of young children with measles in this city have been in part responsible for the low death rate.

The highest relative completeness of reporting and the thoroughness of application of medical and nursing supervision of measles as described by the health officers of Milwaukee and Berkeley may explain their favorable death rates.

However, such *ex cathedra* opinions cannot be offered with any conviction in view of the variables concerning which we can present no exact data.

There do not seem to be any consistent excellencies or inadequacies of control procedures to account for the differences in death rates from measles at all ages among the 32 cities. These differences appear in general to be related more to the proportion of children of the particularly susceptible ages in the several cities than to differences in the value or completeness of measures intended for control.

It is quite evident that the fall in death rate from measles at all ages from the first to the second quinquennium was of no greater order of magnitude in the cities with the best reporting performance (C) than in the cities with the lowest reporting ratio to live births (A).

In Table XXIX will be found a summary of case incidence, case fatality, and death rates for the 3 groups of cities and for the cities individually, for persons of all ages and for all of the years for which the necessary data were obtainable in any or all of the 10 years 1924–1933.

VII

RELATIONS OF INCIDENCE, CASE FATALITY, AND DEATH RATES FOR WHOOPING COUGH, TO CONTROL PROCEDURES IN PARTICULAR CITIES AND GROUPS OF CITIES

A. REPORTED CASE INCIDENCE OF WHOOPING COUGH

While in 1924 only 8 of the 32 cities (Berkeley, Boston, East Orange, Los Angeles County, Minneapolis, Newark, Pittsburgh, and San Francisco) recorded the incidence of whooping cough by the 5 age groups analyzed in this study (under 1, 1 to 2, 2 to 4, 5 to 14, and 15 and over) in 1933 all but 6 of the 32 cities recorded their reported whooping cough cases in this detail.

In 1924 there were 4 cities (Austin, Birmingham, Kansas City, and Providence) in which cases of whooping cough were not reported, while in 1933, Austin was the only one of the 32 cities where the reporting of whooping cough was not required

The incidence rates by separate years, for the two 5 year periods, and for the entire decennium, 1924–1933, for each of the 5 age groups, and for persons at all ages, for such cities as could provide the data consistently for the entire 10 years are to be found in Table XXX.

In Table XXXI will be found the case incidence rates calculated for the total exposed population for which records are available in any one year or period of years for the 10 years separately, the two quinquennia and the decennium as a whole, and for the several age groups and all ages.

In Table XXXII the incidence rates are given for each age group and for each year for those 12 * of the 32 cities which recorded both cases and deaths for each of the 10 years consecutively.

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* Baltimore (ex. 1924, 1925), Berkeley, Boston, Birmingham (ex. 1924, 1925), Detroit (ex. 1924, 1925), East Orange, Los Angeles, Minneapolis (ex. 1925), Newark, Pittsburgh, San Francisco, Syracuse (ex. 1924, 1925).

TABLE XXX

Whooping Cough—Case Incidence per 100,000

Under 1 Year of Age (11 Cities)

	1924	1925	1926	1927	1928	1924–28	1929	1930	1931	1932	1933	1929–33	1924–33
Berkeley	795.5	4,406.8	1,123.6	3,910.6	333.3	2,112.4	3,314.9	1,318.7	4,918.0	1,195.7	5,513.5	3,256.8	2,692.5
East Orange	3,041.8	3,846.2	1,579.6	4,290.8	2,920.6	3,136.4	3,665.5	2,022.5	4,304.6	1,733.5	1,914.9	2,714.0	2,915.0
New Haven	.....	2,227.4	622.0	791.1	2,287.2	1,480.2	548.4	942.6	644.9	1,898.7	1,905.7	1,152.2	1,413.2
Minneapolis	192.1	.....	299.0	120.3	196.7	202.2	745.8	153.1	184.9	325.5	411.9	345.1	280.6
Newark	2,365.0	2,566.0	2,156.0	3,350.0	2,265.1	2,538.0	2,757.9	1,326.2	3,712.3	1,864.5	2,077.6	2,351.6	2,450.0
Rochester	.....	1,101.0	1,274.7	652.3	1,202.1	1,058.5	1,642.3	795.4	1,487.5	795.0	1,487.5	1,161.1	1,112.7
Baltimore	1,673.0	2,838.4	2,257.0	1,884.6	3,183.1	2,358.9	2,474.9	834.8	3,025.2	3,388.4	1,928.4	2,323.8	2,342.3
Boston	566.6	1,316.7	997.3	1,137.4	1,160.9	1,031.8	525.8	.....	566.3	1,389.5	2,177.7	1,145.4	1,079.2
Los Angeles Co.	1,009.8	1,832.9	592.2	659.7	1,698.7	1,162.1	1,633.2	1,142.8	1,023.1	1,682.9	1,603.2	1,418.9	1,310.9
Pittsburgh	1,551.7	451.4	2,333.1	659.0	793.2	1,160.2	976.1	911.7	1,409.9	1,348.5	1,593.1	1,244.4	1,201.3
San Francisco	61.1	2,069.9	415.8	1,036.7	823.7	881.0	889.9	219.6	992.8	490.7	2,704.0	1,055.8	967.4
One Year of Age (9 cities)													
Berkeley	1,022.7	5,084.7	2,696.6	3,687.2	1,333.3	2,764.0	2,762.4	2,307.7	4,699.5	2,173.9	5,729.7	3,541.0	3,157.9
East Orange	3,512.9	4,952.8	1,898.0	5,376.3	2,163.5	3,583.3	6,295.4	2,314.3	5,030.7	2,592.6	3,482.6	3,950.0	3,762.6
New Haven	.....	2,847.9	935.5	863.6	2,716.2	1,842.7	481.3	768.3	1,117.3	1,535.9	995.2	965.7	1,390.6
Minneapolis	100.0	.....	277.7	88.7	239.3	175.9	590.3	137.8	310.0	329.5	174.7	310.0	248.6
Newark	3,673.7	2,927.0	1,558.4	3,609.9	2,621.8	2,884.6	2,686.0	1,730.6	3,257.2	2,281.7	2,509.2	2,473.0	2,691.3
Boston	612.5	2,563.9	4,354.4	1,066.6	2,356.3	2,185.5	2,546.1	.....	566.3	.....	2,184.6	2,452.9	2,281.6
Los Angeles Co.	714.8	1,352.4	520.9	652.8	1,223.3	897.9	1,658.6	959.2	944.1	1,857.7	1,578.1	1,402.8	1,189.8
Pittsburgh	1,296.5	469.4	2,037.5	545.8	963.4	1,063.6	1,102.1	1,077.0	1,413.6	1,283.7	1,709.2	1,314.6	1,186.3
San Francisco	91.6	966.0	462.0	789.1	652.8	591.4	905.5	203.9	914.0	712.4	2,560.8	1,055.8	821.0
2–4 Years of Age (9 cities)													
Berkeley	1,011.6	6,949.5	2,392.9	6,771.4	1,910.6	3,814.6	3,638.2	1,698.2	5,980.2	3,445.0	6,875.4	4,361.7	4,103.3
East Orange	4,558.2	8,096.2	3,214.1	7,531.2	3,634.9	5,408.2	7,854.3	3,490.3	9,804.7	3,956.0	4,701.6	5,964.2	5,684.5
New Haven	.....	3,155.4	1,465.9	1,500.3	2,734.1	2,218.7	776.1	1,568.4	1,208.6	2,695.8	1,904.0	1,606.3	1,901.2
Minneapolis	151.8	.....	217.2	74.1	236.7	169.9	618.5	153.8	247.6	280.9	577.1	375.6	283.6
Newark	3,567.8	3,089.4	2,376.1	3,347.2	2,724.4	3,026.6	3,123.9	1,628.8	3,686.3	2,196.6	2,601.9	2,949.6	2,847.9
Boston	664.0	2,023.4	3,822.0	1,193.2	1,852.0	1,907.5	1,764.7	.....	1,293.7	.....	2,703.1	1,913.2	1,909.6
Los Angeles Co.	782.0	1,415.5	589.0	869.6	1,421.6	1,028.6	1,564.8	1,067.5	1,047.0	1,964.8	1,870.2	1,512.4	1,310.3
Pittsburgh	1,495.1	541.4	2,496.8	732.8	1,220.0	1,297.7	1,406.4	1,320.0	1,698.9	1,610.4	2,276.9	1,659.9	1,475.9
San Francisco	148.0	1,396.1	396.9	1,178.8	614.0	746.9	1,038.8	389.6	1,116.7	1,054.7	2,776.5	1,276.4	1,012.6
5–14 Years of Age (11 cities)													
Berkeley	440.1	3,542.6	975.9	3,055.8	810.1	1,766.2	1,431.3	942.8	2,260.2	1,358.0	3,727.4	1,967.3	1,873.0
East Orange	1,501.8	3,044.8	918.4	2,334.2	744.6	1,702.6	3,368.4	1,427.8	3,512.1	1,130.3	1,341.3	2,144.7	1,931.0
Hartford	153.4	408.3	313.2	317.0	355.3	309.4	284.5	167.5	17.1	544.8	158.5	234.9	270.4
Minneapolis	32.0	.....	99.8	53.6	672.3	221.2	1,532.8	236.8	740.9	616.7	750.2	770.3	541.2
Newark	1,390.6	1,006.4	614.1	986.9	749.9	948.6	761.6	658.0	2,500.3	660.4	794.6	1,075.0	1,012.4
Rochester	.....	267.4	202.9	126.9	261.9	214.6	386.6	208.0	413.2	151.3	378.4	307.3	267.3
Baltimore	584.8	1,075.2	816.8	784.5	888.9	830.7	1,183.4	312.8	947.9	1,193.2	593.1	845.4	838.3
Boston	166.6	513.1	929.9	271.1	549.8	486.4	552.0	.....	444.0	.....	816.3	604.6	531.2
Los Angeles Co.	305.0	655.0	234.4	347.3	564.5	424.8	706.8	563.9	439.9	835.7	831.6	689.7	578.4
Pittsburgh	448.8	142.6	702.7	204.3	356.6	370.7	402.5	376.6	490.5	480.8	643.7	480.0	426.8
San Francisco	114.0	777.9	218.8	636.7	408.9	432.3	620.5	293.4	784.2	741.6	1,573.0	807.4	624.9

(Continued on next page)

TABLE XXX (Cont.)

Whooping Cough—Case Incidence per 100,000

15 Years of Age and Over (11 cities)

	1924	1925	1926	1927	1928	1924–28	1929	1930	1931	1932	1933	1929–33	1924–33
Berkeley	3.8	18.1	0.0	28.5	3.2	10.8	18.7	4.5	14.6	9.9	34.4	16.7	14.0
East Orange	17.4	21.1	10.2	7.9	1.9	11.4	9.3	1.8	14.1	6.8	5.0	7.4	9.3
Hartford	0.9	8.0	7.0	3.4	1.7	4.2	1.7	5.7	4.8	9.5	1.6	4.7	4.4
Minneapolis	4.4	.....	0.3	0.0	0.3	1.2	1.1	0.0	0.8	1.1	1.3	0.9	1.0
Newark	15.1	1.6	4.5	4.1	2.5	5.5	3.4	1.9	4.0	2.4	1.8	2.7	4.1
Rochester	.....	5.6	8.4	1.2	2.1	4.3	3.2	1.2	3.6	2.7	2.3	2.6	3.3
Baltimore	1.9	4.7	4.2	3.4	5.4	4.0	3.4	0.8	4.5	6.4	2.6	3.5	3.7
Boston	1.8	4.2	9.2	2.8	3.6	4.3	3.4	.....	3.0	2.5	3.7	3.4	3.9
Los Angeles Co.	4.4	7.7	3.6	3.8	7.5	5.4	5.2	3.0	4.7	6.5	5.8	5.3	5.3
Pittsburgh	20.4	9.0	32.9	9.8	12.8	17.0	15.3	18.2	17.3	18.9	20.0	18.0	17.5
San Francisco	0.0	4.0	1.7	0.8	2.0	1.7	1.2	0.0	0.0	1.4	2.8	1.1	1.4
All Ages (28 cities)													
Albuquerque	74.4	178.6	617.2	34.0	284.3	280.4	2,549.2	96.8	196.7	271.7	728.8	741.0+	536.2
Berkeley	131.9	925.4	281.1	812.1	209.9	472.4	422.7	239.3	650.7	357.5	906.2	521.8+	499.1
Charleston	39.7	26.2	63.7	98.8	69.6	59.4	110.1	99.8	9.7	6.6	248.1	94.5+	76.6
East Orange	514.5	900.0	311.3	745.4	305.9	514.5	870.4	368.2	924.0	337.0	393.2	573.8+	563.8
Madison	1,048.0	628.4	340.8	769.1	53.1	1,048.0	502.9	930.2	149.3	842.7	661.6	618.8—	589.2
Racine	83.2	359.6	974.0	652.4	498.4	516.6	378.2	516.5	716.9	146.7	953.4	544.3+	530.9
Hartford	83.0	209.9	159.2	178.9	122.1	162.4	122.1	80.7	151.3	237.4	64.4	131.3—	146.2
New Haven	186.4	467.4	206.6	149.4	475.3	297.0	108.2	207.2	168.4	312.9	239.1	207.2—	252.1
Syracuse	59.5	312.7	862.1	152.6	618.6	403.6	581.4	757.7	542.3	941.7	363.8	636.5+	525.3
Minneapolis	21.1	24.0	36.0	15.4	126.4	45.3	297.7	49.7	139.9	123.5	156.4	152.7+	101.4
Newark	600.1	471.1	319.8	492.8	370.4	450.3	396.8	255.3	759.7	291.5	334.7	407.5—	428.6
Portland	17.7	93.0	29.7	57.6	2.0	39.8	13.1	120.2	23.8	49.1	23.8	45.8+	42.9
Rochester	87.1	141.2	139.1	73.9	146.3	117.6	174.7	90.3	161.4	62.9	147.2	127.1+	122.5
Seattle	51.3	529.7	72.0	200.8	107.8	191.7	427.5	189.5	459.8	66.4	198.4	266.8+	230.5
Washington	106.1	160.6	217.6	100.5	114.7	139.8	163.1	59.0	145.9	138.2	79.8	117.0—	128.1
Baltimore	245.9	458.7	338.4	304.7	408.5	351.5	444.9	127.4	303.9	458.2	248.9	336.8—	344.0
Boston	85.9	264.0	454.3	145.4	246.4	239.4	232.8	290.3	188.6	246.0	329.8	257.6+	248.6
Buffalo	274.1	185.1	194.1	132.0	289.8	215.0	174.8	192.3	189.8	237.1	287.5	216.9+	216.0
Chicago	125.0	146.7	85.3	148.2	137.2	128.8	108.5	100.7	149.9	133.7	69.3	112.3—	120.1
Cleveland	279.1	278.0	415.3	164.7	319.5	291.2	319.1	282.2	328.1	493.2	216.1	327.8+	310.0
Detroit	165.5	253.8	223.9	257.8	366.9	256.9	268.6	219.1	328.8	349.4	284.8	219.2+	275.7
Los Angeles	73.9	194.7	30.0	68.4	180.6	110.7	117.0	93.5	85.2	177.0	171.2	130.6+	122.0
Los Angeles Co.	116.3	229.2	86.5	122.1	211.9	154.6	246.8	180.5	166.3	292.8	281.7	234.7+	201.0
Milwaukee	280.4	371.0	560.0	271.2	419.7	361.2	672.8	364.9	433.2	674.2	565.5	542.5+	466.1
New York	133.1	76.3	54.1	92.0	87.6	88.3	43.1	65.2	121.9	98.7	81.8	82.5—	85.3
Philadelphia	203.9	164.4	84.2	77.2	204.7	146.8	151.7	55.1	193.8	270.4	37.7	141.7—	144.2
Pittsburgh	240.3	81.5	375.5	107.3	172.9	195.2	196.7	185.8	237.3	226.4	298.7	229.6+	212.9
San Francisco	21.0	180.1	50.7	135.0	85.2	94.7	124.8	50.4	142.8	128.8	310.9	153.2+	125.5

TABLE XXXI

Reported Case Incidence Combined per 100,000 of Corresponding Populations for those Cities, Years, and Age Groups for Which Records Are Available

	Case Incidence per 100,000					
	Under 1	*1–2*	*2–4*	*5–14*	*15 and Over*	*All Ages*
1924	1,156.6	1,122.4	1,228.7	446.0	6.2	157.8
1925	1,834.2	1,858.2	1,927.9	707.9	5.8	183.6
1926	1,497.4	1,853.0	1,990.4	581.1	7.7	158.4
1927	1,228.4	1,197.5	1,419.2	437.3	2.9	143.5
1928	1,509.4	1,550.5	1,699.7	526.2	5.8	186.1
1924–28	1,424.9	1,490.2	1,647.1	523.6	5.4	165.9
1929	1,424.0	1,483.6	1,615.9	592.7	5.8	174.5
1930	1,062.3	983.6	1,145.8	389.9	4.2	133.2
1931	1,457.0	1,531.1	1,703.9	631.5	7.1	200.7
1932	1,615.0	1,697.1	1,893.7	684.0	6.5	212.7
1933	1,406.6	1,415.9	1,692.8	588.5	4.7	169.5
1929–33	1,396.7	1,426.4	1,619.1	579.2	5.7	194.3
1924–33	1,407.5	1,451.1	1,629.5	558.4	5.6	172.5

It will be noted from Table XXX that the averaged case incidence for children under 1 year of age for the second quinquennium (1929–1933) was higher than that for the first quinquennium in all but 4 (East Orange, New Haven, Newark and Baltimore) of the 11 cities for which records were available.

For children between 1 and 2 years of age, all but 2 cities (New Haven and Newark) of the 9 listed showed an increase in the average incidence of whooping cough in the second compared with the first quinquennium.

For children between 2 and 4 years of age all but 3 cities (East Orange, New Haven, and Newark) of the 9 cities listed showed an increase in the average incidence of whooping cough from the first to the second quinquennium.

For children 5 to 14 years of age all of the 11 cities listed, except Hart-

TABLE XXXII

Reported Case Incidence, Whooping Cough, Combined per 100,000 Population for 12 Cities in Which Records Were Available for the Entire Decennium, 1924–1933*

	Under 1	*1–2*	*2–4*	*5–14*	*15 and Over*	*All Ages*
1924	1,029.2	1,172.5	1,292.3	445.4	7.8	181.9
1925	1,559.1	1,871.1	1,930.3	674.8	5.7	267.9
1926	1,532.8	1,880.3	2,005.3	607.9	7.7	269.6
1927	1,346.2	1,288.0	1,506.1	524.7	3.8	211.8
1928	1,724.7	1,825.2	1,982.4	664.5	4.8	273.3
1924–28	1,476.1	1,625.3	1,776.5	580.1	5.6	241.1
1929	1,648.9	1,861.1	1,938.8	758.6	4.9	284.5
1930	1,105.8	1,151.7	1,307.9	475.8	4.6	183.8
1931	1,694.3	1,921.6	2,011.5	837.7	5.0	297.9
1932	1,804.4	1,874.1	2,143.1	832.4	6.4	304.8
1933	1,704.4	1,735.4	2,004.3	783.2	5.3	283.2
1929–33	1,589.1	1,717.7	1,886.8	744.0	5.3	272.7
1924–33	1,544.7	1,676.6	1,838.8	674.3	5.4	259.2

* Baltimore (ex. 1924, 1925), Berkeley, Boston, Birmingham (ex. 1924, 1925), Detroit (ex. 1924, 1925), East Orange, Los Angeles, Minneapolis (ex. 1925), Newark, Pittsburgh, San Francisco, Syracuse (ex. 1924, 1925).

ford, recorded an increase in the averaged incidence rate from the first to the second quinquennium.

For persons 15 years of age and over, only 3 cities (Berkeley, Hartford, Pittsburgh) of the 11 listed recorded an increase in the averaged incidence rate from the first to the second quinquennium.

For persons of all ages, 19 cities of the 28 listed recorded increases, and 9 decreases, in the averaged incidence rate for whooping cough from the first to the second quinquennium.

Even the irregularity in prevalence of whooping cough cannot explain the spread between such cities as East Orange and Berkeley in which the number of cases of whooping cough reported in the decennium amounted to 64 per cent and 54 per cent respectively of the number of live births recorded in the same 10 years, and the cities of Charleston and Portland in which the number of cases of whooping cough reported amounted to less than 3 per cent of the number of live births in the same 10 year period.

Summary of experience of the cities recording incidence by age groups for both first and second quinquennia, i.e., the numbers in each category with increase, and with decrease in incidence rates

	All Ages	*Under 1*	*1–2*	*2–4*	*5–14*	*15 and Over*
Cities for which data are available	28	11	9	9	11	11
Number showing increase in average incidence rate from first to second quinquennium	19	7	7	6	10	3
Number showing decrease	9	4	2	3	1	8

If one could be assured that the relative completeness of reporting of whooping cough had been similar or stationary during the two quinquennia, these changes might be used for forming an opinion as to the worth of control measures applied in the several cities, but there is abundant evidence that reporting of whooping cough cases is incomplete in all cities, and of different degree among the cities, and for the two quinquennia.

Some idea of the variation in extent to which cases of whooping cough are reported in the several 29 cities for which necessary data were available for the two quinquennia together with the relation of such reporting to the calculated case fatality rates in these cities can be obtained from Table XXXIII in which the number of cases of whooping cough reported is expressed as a percentage of live births recorded in the city for the same period of time.

It will be further noted that while 14 cities in the first quinquennium 1924–1928 reported whooping cough cases of all ages at a lower ratio to live births than the average experience of all cities for the 10 year period, only 10 cities showed so low a ratio in the second quinquennium, indicating either an improvement in reporting whooping cough, or the effect of the reduction in the birth rate of the community in the same period, or both.

The reduction in live births in 29 cities listed in Table XXXIII in the second as compared with the first quinquennium amounted to 255,023 (−11.1 per cent) and there were reported 185,170 cases of whooping cough at all ages in the first and 221,084 in the second quinquennium, or an increase of +19.3 per cent.

It would appear that there had been some improvement in the relative completeness with which cases of whooping

TABLE XXXIII

Twenty-nine Cities Arranged in Order of the Per cent of Births Represented by Reported Cases of Whooping Cough at all Ages in the Decennium 1924–1933 and in the Two Contained Quinquennia, and Case Fatality Per cents for the Same Periods

	1924–1933		1924–1928		1929–1933	
	Per Cent	*Case Fatality*	*Per Cent*	*Case Fatality*	*Per Cent*	*Case Fatality*
East Orange	63.9	0.3	69.4	0.5	59.9	0.2
Berkeley	54.1	0.4	44.4	0.4	65.0	0.3
Syracuse	26.4	1.0	18.9	1.5	34.3	0.7
Racine	26.1	0.9	24.1	1.1	28.1	0.6
Milwaukee	24.1	0.7	17.7	1.0	31.2	0.6
Madison	23.0	0.3	21.7	0.6	24.7	0.1
Albuquerque	21.4	5.0	11.5	6.7	28.9	4.5
Newark	19.1	1.0	18.5	1.3	19.7	0.7
Baltimore	17.7	2.1	16.4	2.6	19.1	1.7
Seattle	16.5	0.8	13.0	1.2	20.3	0.4
Cleveland	15.5	1.6	12.8	2.1	18.6	1.1
Detroit	13.4	1.7	10.7	2.2	16.5	1.3
Los Angeles Co.	11.8	1.8	8.5	3.5	16.8	1.0
New Haven	11.8	1.4	12.9	2.0	10.4	0.6
Boston	10.7	2.2	9.7	3.1	11.7	1.4
Buffalo	10.5	2.0	9.5	2.2	11.6	1.8
Pittsburgh	9.9	2.5	8.9	3.6	11.3	1.7
San Francisco	9.7	1.5	6.6	2.5	13.0	1.1
All Cities	9.3	2.2	7.9	3.0	10.8	1.1
Los Angeles	8.8	2.9	6.0	3.8	12.7	2.3
Philadelphia	7.7	2.7	7.2	3.7	8.4	1.7
Chicago	7.0	2.1	6.8	2.6	7.3	1.6
Rochester	6.7	3.3	5.8	4.4	7.7	2.3
Washington	6.6	3.3	7.2	3.4	6.0	3.2
Hartford	5.8	2.2	6.1	2.4	5.6	1.9
Minneapolis	5.4	2.8	2.1	8.3	9.3	1.3
New York City	4.8	4.3	4.4	5.9	5.1	2.7
Birmingham	3.6	9.2	3.3	10.3	4.1	8.2
Charleston	2.8	11.2	2.2	16.8	3.4	7.6
Portland	2.8	3.5	2.3	5.8	3.5	1.7

cough were reported in these cities during the decade 1924–1933. However, it is believed that the case incidence of whooping cough based upon the number of cases reported to the health department rarely bears a relation of reasonable exactness to the prevalence of the disease in the community except in the most general terms, and any deductions as to relative worth of measures intended for control of the disease based on differences in such case incidence rates would be valueless, whether related to the experience of different cities, or to that of the same city in different years. The same type of statement might be made with equal force regarding the use of case fatality per cents as basis for comparison of the relative effectiveness of administrative procedures in cities of the United States during the period of years under discussion.

From Tables XXXIII and XXXIV it would appear that when such cities as East Orange, Berkeley, and Albuquerque, with relatively high ratios of cases of whooping cough reported to live births (21.4 per cent or over) in the decennium, are compared with Birming-

TABLE XXXIV

Percentage Distribution of Cases of Whooping Cough by Age Groups in 13 Cities for Which Data Are Available—1924–1933

	Under 1		1 to 2		2 to 4		5 to 14		15 and Over	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Group C cities										
East Orange	252	6.8	312	8.4	1,406	37.8	1,697	45.6	49	1.3
Berkeley	243	6.1	285	7.2	1,216	30.8	2,107	53.5	88	2.2
Group B cities										
Albuquerque	93	6.9	82	6.1	367	27.2	546	40.4	18	1.3
Group A cities										
Rochester	439	15.6	194	6.9	768	27.3	1,338	47.5	74	2.6
Minneapolis	166	3.7	148	3.3	549	12.0	3,610	80.2	32	0.7
Birmingham	248	12.4	284	14.2	753	37.7	666	33.3	45	2.3

ham, Minneapolis, and Rochester with low ratios, the relative incompleteness of reporting of whooping cough affects the various age groups uniformly rather than selectively. The age distribution of the population of the above named 6 cities was as follows in 1930:

	Under 5 Years	5–14 Years	15 and Over
	Per Cent	Per Cent	Per Cent
East Orange	6.1	13.1	80.8
Berkeley	6.0	14.2	79.7
Albuquerque	9.1	19.1	71.9
Rochester	7.0	17.1	75.9
Minneapolis	7.4	16.3	76.3
Birmingham	8.8	18.2	73.0

While neither the method proposed by Sydenstricker and Hedrich * for testing the completeness of reporting whooping cough for Hagerstown experience, nor that of Green and Moorehouse * for Cleveland experience is applicable to the material available for the present study, the following may be of interest.

Green and Moorehouse estimate that the true case fatality per cent for Cleveland was 1.6 instead of 2.1 for whooping cough at all ages for the 6 years 1923–1928 or less by 23.8 per cent than the rate based on the recorded deaths among reported cases of the disease.

It is believed from the present study that the use of the ratio between reported cases of whooping cough at all ages or only under 5 years of age to total live births, based on a moving 10 year experience would give the health officer a better indication of the relative completeness of reporting of whooping cough in his community than by any other method, except perhaps the expensive and time consuming procedure of house-to-house canvassing of sample population groups.

* See References 2 and 3, p. 36.

Sydenstricker and Hedrich—Mean Annual Case Incidence Rates for Whooping Cough Based on (a) Canvasses Over a 2 Year Period (1922–1923) and (b) Cases Reported to Health Department at Different Ages per 1,000 of Appropriate Population

	Under 1	2 and 3	4 and 5	Under 5	5 to 9	10 to 14	15 and Over	All Ages
(a)	102.8	97.2	92.5	101.3	58.7	6.9	1.–	19.6
(b)	13.5	19.5	16.6	17.2	10.8	2.8	.1	3.3

B. CASE FATALITY

The case fatality of whooping cough for the entire decade 1924–1933 for the cities separately and for all cities combined for persons at all ages, and the case fatality in all the 12 cities taken together for which data were available for each of the 10 years, and for the 5 age groups in all instances, will be found in Tables XXXV and XXXVI.

In Table XXXVII are presented the case fatality rates for those cities and for the years in which the distribution of cases and deaths from whooping cough is available by the 5 age groups, the experience for each year not in all instances being that of identical cities. The changes in rates differ but slightly from those given in Table XXXVI in which for a smaller number of cities,

TABLE XXXV

Case Fatality Per Cent from Whooping Cough in 29 Cities for Persons at All Ages, 1924–1933

	Case Fatality Per Cent		*Case Fatality Per Cent*		*Case Fatality Per Cent*
Cities under 100,000 population		*Cities between 250,000 and 500,000*		*Cities over 500,000*	
Albuquerque	5.0	Birmingham	9.2	Baltimore	2.1
Berkeley	0.4	Minneapolis	2.8	Boston	2.2
Charleston	11.2	Newark	1.6	Buffalo	2.0
East Orange	0.3	Portland	3.5	Chicago	2.1
Madison	0.3	Rochester	3.3	Cleveland	1.6
Racine	0.9	Seattle	0.8	Detroit	1.7
Cities between 100,000 and 250,000		Washington	3.3	Los Angeles	2.9
Hartford	2.2			Los Angeles County	1.8
New Haven	1.4			Milwaukee	0.7
Syracuse	1.0			New York	4.3
				Philadelphia	2.7
				Pittsburgh	2.5
				San Francisco	1.5
				All cities	2.2

TABLE XXXVI

Case Fatality Per Cent for Whooping Cough in 12 Cities for 10 Years Separately, for the Two Quinquennia and for the Decennium by 5 Year Age Groups and for Persons at All Ages*

	Under 1	*1 to 2*	*2 to 4*	*5 to 14*	*15 and Over*	*All Ages*
1924	14.0	5.9	1.1	0.1	0	2.4
1925	6.7	5.5	0.9	0.1	0	2.0
1926	16.9	8.6	2.6	0.25	0.6	3.2
1927	11.1	5.0	1.3	0.16	0.6	2.0
1928	11.8	5.0	1.4	0.1	0	2.1
1924–28	13.2	6.2	1.0	0.1	0.3	2.4
1929	11.4	5.0	0.6	0.08	0	1.8
1930	8.7	3.5	0.7	0.1	0	1.4
1931	8.6	3.1	0.5	0.07	0	1.2
1932	6.9	3.3	0.3	0.09	0	1.1
1933	6.1	2.4	0.5	0.2	0	0.9
1929–33	8.3	3.5	0.5	0.07	0	1.3
1924–33	10.3	4.7	1.3	0.1	0.1	1.7

* Baltimore, Boston, Berkeley, Birmingham, Detroit, East Orange, Los Angeles County, Minneapolis, Newark, Pittsburgh, San Francisco, Syracuse.

TABLE XXXVII

Case Fatality Per Cents for Whooping Cough for All Cities for Which Records Were Available, for Each Age Group and Year Specified, and Not in All Instances in Each Year and Age for the Same Cities

	Under 1	*1 to 2*	*2 to 4*	*5 to 14*	*15 and Over*	*All Ages*
1924	12.8	4.8	1.0	0.06	0	2.9
1925	13.7	5.7	1.0	0.1	0	3.2
1926	17.0	8.8	1.0	0.25	0.79	3.4
1927	10.5	4.9	1.3	0.12	0.47	2.5
1928	12.0	5.3	1.1	0.09	0	2.9
1924–28	13.0	4.0	1.0	0.13	0	3.0
1929	11.5	5.2	0.8	0.01	0.28	2.3
1930	7.9	3.8	0.6	0.07	0.2	1.7
1931	8.0	3.7	0.5	0.05	0	1.5
1932	7.1	2.5	0.3	0.08	0	1.2
1933	5.2	2.1	0.4	0.04	0	1.4
1929–33	7.8	3.4	0.5	0.07	0.04	1.4
1924–33	9.9	4.4	0.7	0.09	0.12	2.2

the information is available for the same cities for each year and for each age group.

For 17 cities the recorded cases and deaths from whooping cough among children under 5 years of age were available for each of the 10 years, 1924–1933 (Table XXXVIII).

This offers a good basis for comparison of the variation in complete-

TABLE XXXVIII

Seventeen Cities Arranged in Order of Ratio of Reported Cases of Whooping Cough Under 5 Years of Age to Live Births, Expressed in Percentage of the Latter, Together with the Case Fatality Per Cent Under 5 for Corresponding City and Period of Time

	1924–33		*1924–28*		*1929–33*	
	Ratio of Cases Under 5 to Births	*Case Fatality Per Cent*	*Ratio*	*Case Fatality Per Cent*	*Ratio*	*Case Fatality Per Cent*
East Orange	33.9	0.6	37.5	0.8	30.3	0.4
Berkeley	24.1	0.8	19.4	0.9	29.0	0.7
Syracuse	13.4	1.8	8.6	3.2	18.5	1.1
Los Angeles Co.	10.5	3.9	5.0	7.7	22.7	2.0
Newark	10.4	1.8	10.9	2.1	9.8	1.4
Albuquerque	8.6	11.8	1.6	47.7	13.9	8.6
Baltimore	8.3	4.4	6.4	6.4	10.5	2.9
Detroit	6.9	3.2	4.6	5.0	9.0	2.2
Boston	5.8	4.2	6.2	4.6	5.2	3.9
New Haven	5.8	2.7	6.3	4.1	5.4	1.0
Pittsburgh	5.5	4.3	4.7	5.9	6.7	3.2
All cities	5.4	3.8	4.4	5.6	6.8	2.6
Rochester	4.3	4.9	4.2	5.8	4.4	3.8
San Francisco	3.9	3.6	2.8	5.2	5.1	2.6
Hartford	3.8	3.2	4.0	3.5	3.7	2.9
Chicago	3.0	4.7	1.9	8.6	4.1	2.7
Birmingham	2.3	17.6	2.1	23.3	2.6	12.2
Minneapolis	1.2	14.2	0.5	30.9	1.5	7.5

ness of reporting whooping cough cases among the 17 cities for which the data were available and the effect of this on the differences in case fatality rates.

In Table XXXVIII the number of cases reported under 5 years of age is expressed as a percentage of live births in the respective cities for the 5 and 10 year periods.

That city (Minneapolis) in which the total of whooping cough cases reported in children under 5 years of age during the 10 year period, 1924–1933, was only 1.2 per cent of the number of live births in the same period, appears to have a specific case fatality of 14.2 per cent for this age group while East Orange and Berkeley with an indicated ratio of cases under 5 years to live births in the 10 year period of 34 per cent and 24 per cent respectively show a specific age case fatality per cent of less than 1 in each community.

Improvement in reporting of cases of whooping cough in children under 5 is apparently responsible for the change in case-birth ratio from 4.4 per cent in the first quinquennium to 6.8 per cent in the second. The comparable change in case-birth ratio for cases reported at all ages was only from 7.9 per cent to 11.1 per cent for the 31 cities.

The change in case fatality rate for children under 5 years of age in these 17 cities between the first and second quinquennium (from 5.6 per cent to 2.6 per cent) would appear to have followed the more complete reporting of cases at this age, rather than any particular improvement in methods of management or treatment of patients with whooping cough, so far as reports from the health officers of these cities disclose.

Whether we use the most precise and complete of the data available, that for the 12 cities as given in Table XXXVI, or the data for all cities as available for years and age groups without entire uniformity of reporting for the various years and ages as in Table XXXVII, the evidence is quite similar, namely that the case fatality rate fell from the first to the second quinquennium for each age group.

The two factors which appear to be chiefly responsible for these changes are the increase in relative completeness of reporting of cases of whooping cough, particularly in children under 5 years of age, and the reduction in the proportion of the total population living at those ages of special susceptibility to whooping cough, *i.e.*, persons under 5 years of age.

It is estimated that in 1924 for the 32 cities combined the population living in the age group under 5 years was 1,726,501, or 7.9 per cent of the total population of these cities, and in 1933 the number living under 5 years of age is estimated to have been 1,899,673, or 7.0 per cent of the population of the 32 cities.

TABLE XXXIX

	Group A Cities (Low Reporting Ratios)	*Group B Cities*	*Group C Cities (High Reporting Rations)*
Persons exposed 1924–33	164,656,915	70,487,469	1,448,375
Reported cases of whooping cough of all ages	182.004	216,586	7,655
Deaths from whooping cough among these cases	5,717	3,292	27
Case incidence per 100,000	110.5	307.2	528.50
Case fatality per cent	3.1	1.5	.35
Death rate per 100,000	3.5	4.7	1.80

TABLE XL

Death Rates for Whooping Cough by Age Groups, Years and Cities, 1924–1933
Under 1 Year of Age for 27 Cities

	1924	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930*	*1931*	*1932*	*1933*	*1929–33*	*1924–33*
Albuquerque	0	261.1	2,233.3	0	1,354.4	794.0	5,183.6	0	0	191.2	368.3	1,073.6	949.2
Berkeley	113.6	113.0	0	335.2	0	112.4	110.5	109.9	0	0	216.2	87.4	99.7
Charleston	586.3	170.8	87.1	266.7	272.2	787.7	556.1	378.8	96.8	0	405.3	290.4	284.3
East Orange	0	124.1	0	238.4	116.8	97.3	229.1	0	0	0	0	44.1	69.4
Madison	129.2	0	236.4	453.0	0	165.4	0	0	0	0	181.7	38.9	96.0
Racine	.....	.....	531.9	76.4	76.8	229.2	77.2	233.1	0	78.6	158.0	109.4	154.9
Hartford	0	179.9	154.4	73.5	185.7	116.3	187.7	151.8	38.4	271.6	0	130.5	123.2
New Haven	32.0	133.0	69.1	0	412.4	124.4	117.5	41.0	0	0	47.6	43.0	88.1
Syracuse	61.7	341.0	435.9	0	251.3	218.0	284.0	190.2	95.5	159.9	128.6	172.0	195.2
Birmingham	276.9	197.5	532.7	213.8	303.1	305.1	412.0	202.3	44.2	152.0	85.4	176.7	237.9
Minneapolis	88.7	.....	194.4	105.3	75.7	116.1	197.9	61.4	46.2	62.0	31.2	80.1	96.3
Newark	210.5	164.3	129.1	263.8	134.8	180.7	137.9	84.7	202.2	103.6	60.7	118.4	151.3
Providence	199.0	136.3	677.3	240.3	198.0	289.6	331.5	236.8	54.3	112.4	174.5	194.9	241.1
Rochester	162.5	187.0	297.4	87.0	378.5	221.0	228.1	46.8	167.9	24.6	151.8	124.7	175.8
Seattle	41.6	316.3	42.8	108.5	0	102.7	156.6	0	115.4	0	0	55.4	79.9
Washington	123.1	216.3	372.3	140.1	156.3	201.6	251.1	126.1	253.2	174.8	63.8	174.1	188.0
Baltimore	233.8	357.6	228.0	271.4	403.8	297.9	202.2	99.2	329.6	253.4	194.6	211.3	256.9
Boston	75.5	261.8	455.4	88.1	228.9	221.4	141.9	119.4	78.4	160.3	118.5	123.7	175.1
Buffalo	326.6	123.7	156.3	63.2	138.4	162.6	161.4	261.0	77.0	166.8	168.7	167.1	164.8
Chicago	116.4	157.5	76.0	97.6	97.8	109.1	60.8	62.9	65.0	75.0	17.8	56.3	82.9
Cleveland	154.6	190.9	343.2	82.6	140.8	183.0	180.2	132.9	117.5	131.9	55.8	124.1	155.3
Detroit	152.7	192.3	164.9	138.7	164.9	162.6	190.1	91.3	161.6	168.4	82.5	138.2	149.7
Los Angeles Co.	.....	539.1	123.4	147.9	253.2	257.4	295.2	82.9	106.8	43.2	50.1	111.1	166.3
Milwaukee	.....	135.8	155.7	103.1	205.0	150.0	224.1	60.7	100.6	100.0	59.6	108.6	126.7
New York	225.5	168.4	111.1	186.8	172.7	173.1	104.5	73.9	114.1	87.0	76.3	91.3	133.3
Pittsburgh	298.1	44.3	509.5	54.2	145.9	211.0	64.5	120.9	122.2	95.0	163.1	112.8	163.1
San Francisco	15.3	291.3	77.0	139.3	108.8	126.3	124.9	31.4	141.8	31.7	159.1	97.7	112.2
27 cities	177.4	190.5	185.3	144.1	172.7	174.0	151.2	91.3	115.4	104.7	79.9	108.6	141.4

TABLE XL (Cont.)

At 1 Year of Age for 26 Cities

	1924	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930*	*1931*	*1932*	*1933*	*1929–33*	*1924–33*
Albuquerque	0	0	259.1	0	712.6	207.0	1,369.9	0	0	0	0	253.8	949.2
Berkeley	0	0	0	111.7	0	22.5	0	0	218.6	0	0	43.7	33.2
Charleston	254.7	85.6	86.4	348.4	0	155.4	177.3	89.4	0	0	91.9	72.2	114.7
East Orange	0	235.8	118.6	119.5	120.2	118.7	0	0	245.4	0	0	49.1	84.4
Madison	0	122.0	0	453.0	0	23.7	0	0	0	0	0	0	11.1
Racine	.....	.....	172.0	76.4	86.4	86.2	0	0	87.0	87.3	0	34.8	54.2
New Haven	125.5	161.8	200.5	0	143.0	127.0	37.0	0	39.9	0	0	16.0	76.4
Syracuse	0	124.0	280.2	0	125.7	105.9	94.7	63.4	31.8	128.0	0	63.7	85.0
Birmingham	367.4	82.3	479.5	207.1	125.9	250.4	171.7	95.6	69.9	204.5	44.3	116.4	178.9
Minneapolis	57.2	.....	87.7	29.6	44.9	55.0	60.5	0	31.0	31.4	31.8	31.0	42.0
Newark	143.8	40.1	54.7	84.0	100.3	84.8	73.4	30.1	77.2	31.7	32.6	49.4	68.2
Providence	111.6	136.0	299.5	46.9	119.1	142.9	121.2	172.7	50.2	51.1	78.1	95.4	120.2
Rochester	37.9	136.9	101.1	41.9	65.1	76.8	112.5	46.8	73.0	0	53.0	58.4	68.5
Seattle	0	0	22.4	46.0	47.1	22.4	72.5	0	50.9	0	0	25.4	23.9
Washington	80.2	64.0	111.6	47.7	111.0	82.9	63.2	63.0	125.7	94.0	31.3	75.4	79.2
Baltimore	85.9	236.5	214.8	120.5	154.0	162.3	196.4	16.5	158.6	84.3	136.2	118.4	140.9
Boston	44.3	179.4	249.9	53.7	101.1	125.7	63.1	119.9	48.6	.....	75.0	76.7	104.7
Buffalo	118.8	90.4	81.6	20.7	73.7	77.5	96.3	32.6	55.3	33.7	68.6	57.5	67.9
Chicago	54.5	81.5	45.8	42.3	56.1	56.1	62.4	25.5	61.4	27.9	6.0	36.8	46.6
Cleveland	.....	128.3	204.2	13.5	139.2	121.8	114.7	66.5	22.8	102.2	32.5	68.5	94.0
Detroit	99.8	83.0	119.0	58.6	101.1	82.5	85.4	42.1	31.2	68.3	16.8	48.5	64.9
Los Angeles Co.	.....	108.2	111.6	34.4	53.2	74.4	99.3	0	27.0	8.7	0	25.3	43.9
Milwaukee	.....	53.9	64.6	43.1	75.3	59.2	96.8	10.8	21.5	43.0	43.0	43.0	50.2
New York	123.7	82.5	66.6	58.8	120.4	90.4	38.0	24.9	52.2	22.4	30.5	33.6	62.7
Pittsburgh	99.7	58.7	194.5	42.6	60.2	91.3	69.4	131.3	97.2	80.2	45.0	84.8	88.1
San Francisco	15.3	92.0	46.2	30.9	31.1	43.1	62.5	0	0	15.8	31.8	22.1	32.7
26 Cities	90.9	94.6	105.8	53.3	96.9	88.3	72.0	37.3	55.7	41.3	31.9	47.8	68.2

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TABLE XL (Cont.)

2–4 Years of Age for 26 Cities

	1924	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930*	*1931*	*1932*	*1933*	*1929–33*	*1924–33*
Albuquerque	0	0	0	0	71.7	15.6	621.1	0	0	0	60.0	128.4	77.4
Berkeley	0	0	0	34.9	0	7.1	33.4	0	0	0	0	6.4	6.7
Charleston	0	26.8	0	80.5	0	21.5	26.8	53.6	0	0	0	6.1	18.8
East Orange	0	0	0	0	0	0	0	0	0	0	0	0	0
Madison	0	0	0	0	0	0	0	0	0	0	0	0	0
Racine	.....	.....	80.7	0	0	26.8	0	0	0	0	51.9	10.5	16.5
New Haven	20.8	53.5	11.0	0	35.2	24.2	12.1	12.5	0	0	0	5.2	15.5
Syracuse	0	10.2	30.7	10.3	10.3	12.3	20.6	0	20.7	10.4	10.4	12.4	12.4
Birmingham	50.9	32.7	86.9	61.1	44.4	55.3	50.2	20.8	13.5	19.7	6.4	21.6	37.1
Minneapolis	4.6	.....	27.7	0	23.2	13.9	18.6	4.7	4.7	0	18.8	9.3	11.4
Newark	19.6	28.0	8.2	16.6	17.0	17.9	0	8.9	9.0	4.6	9.5	6.3	12.4
Providence	0	7.5	68.5	15.4	15.5	21.3	23.5	15.8	8.0	8.0	0	11.2	16.4
Rochester	0	18.4	18.8	0	13.2	10.0	33.7	6.9	0.0	0	15.0	11.3	10.7
Seattle	0	14.4	7.2	7.3	7.3	7.2	22.0	0	7.4	0	0	5.9	6.6
Washington	0	15.8	41.6	25.7	25.5	21.8	20.2	5.0	9.9	14.7	0	9.9	15.7
Baltimore	7.3	27.0	31.9	19.7	27.1	22.6	14.8	2.5	19.9	17.4	7.5	12.4	17.5
Boston	12.2	22.2	32.4	27.7	23.0	23.5	7.7	23.5	15.8	.....	5.4	13.2	19.0
Buffalo	6.5	6.6	16.5	6.7	6.7	8.6	6.8	10.2	3.4	6.9	0	5.5	7.1
Chicago	8.5	9.8	10.5	6.0	8.2	8.8	8.9	5.1	6.5	9.8	3.9	6.9	7.8
Cleveland	.....	14.3	37.6	4.3	19.7	19.0	29.2	13.8	7.1	12.2	5.0	13.7	16.2
Detroit	6.4	18.7	13.3	7.1	12.6	11.6	10.1	7.6	8.5	3.1	13.2	8.5	10.0
Los Angeles Co.	.....	25.4	11.5	3.5	13.1	12.9	12.2	17.0	0	5.3	2.6	7.2	9.3
Milwaukee	.....	10.8	3.6	3.6	7.2	6.3	32.3	3.6	7.2	3.6	7.2	10.7	8.8
New York	18.9	18.6	13.1	12.3	17.5	16.1	6.7	6.7	12.0	7.4	5.3	7.6	11.9
Pittsburgh	27.0	8.2	57.5	8.3	16.6	23.5	11.2	16.9	11.3	5.7	14.3	11.9	17.8
San Francisco	5.1	10.2	5.1	15.2	5.1	8.1	15.2	5.1	10.1	5.0	30.2	13.1	10.6
26 cities	13.1	16.7	19.2	11.4	15.6	15.2	12.8	8.3	9.5	7.4	7.0	9.0	12.1

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TABLE XL (Cont.)

5–14 Years of Age for 26 Cities

	1924	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930*	*1931*	*1932*	*1933*	*1929–33*	*1924–33*
Albuquerque	0	0	0	0	0	0	0	0	0	0	17.4	15.0	8.3
Berkeley	0	0	0	0	0	0	0	0	0	0	0	0	0
Charleston	8.0	0	0	8.0	0.8	4.8	0	0	0	0	0	0	2.4
East Orange	0	0	0	0	0	0	0	0	0	0	0	0	0
Madison	0	0	0	0	0	0	0	0	0	0	0	0	0
Racine	.....	.....	.....	0	0	0	0	0	0	0	0	0	0
Hartford	0	3.9	0	0	0	0.8	0	0	0	0	0	0	0.4
New Haven	0	0	0	0	0	0	3.2	0	0	0	0	0.6	0.3
Birmingham	5.0	0	2.4	2.3	0	1.9	0	0	0	2.0	0	0.4	1.1
Minneapolis	1.5	.....	4.3	1.4	0	1.8	0	0	0	0	1.2	0.3	0.9
Newark	1.2	1.2	0	1.2	0	0.7	0	0	0	0	0	0	0.4
Providence	0	0	4.4	0	0	0.9	4.3	0	0	0	2.1	1.3	1.1
Rochester	1.9	1.9	0	0	0	0.7	0	1.8	0	1.7	0	0.7	0.7
Seattle	0	6.2	2.0	4.0	2.0	2.9	0	0	0	0	2.8	1.2	0.6
Washington	0	0	0	0	0	0	0	0	2.9	0	2.8	1.2	0.6
Baltimore	0.8	0.7	1.5	1.5	1.4	1.2	0	0.7	2.8	0.7	0	0.8	1.0
Boston	0	1.5	3.1	1.5	1.5	1.5	0	1.5	0	.....	0	0.4	1.0
Buffalo	0	0	0	0	2.0	0.4	0	0	0.9	0.9	0	0.4	0.4
Chicago	0.1	0.1	0.7	0.4	0.2	0.6	0.2	0.3	0.7	0.17	0.3	0.35	0.35
Cleveland	0	0	2.5	0.6	1.2	0.9	1.2	0	0.6	2.3	0	0.8	0.9
Detroit	1.0	0	1.3	0.4	0.4	0.6	1.5	0.4	0.3	0.7	0.3	0.6	0.6
Los Angeles Co.	.....	0	0	0	1.9	0.5	0.9	0	0	1.5	0	0.4	0.5
Milwaukee	.....	1.1	0	0	0	0.3	0	0	0	0	0	0	0.1
New York	0.9	0.9	0.4	0.5	1.0	0.8	0.6	0.3	0.8	0.9	0.6	0.6	0.7
Pittsburgh	0	0	2.5	0.8	0.8	0.8	1.6	1.6	0.8	0	0	0.8	0.8
San Francisco	0	0	0	0	0	0.0	0	0	1.3	1.3	0	0.5	0.3
26 cities	0.7	0.7	1.0	0.8	0.7	0.8	0.7	0.4	0.7	0.8	0.4	0.6	0.7

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TABLE XL (Cont.)

At All Ages for 32 Cities

	1924	*1925*	*1926*	*1927*	*1928*	*1924–28*	*1929*	*1930*	*1931*	*1932*	*1933*	*1929–33*	*1924–33*
Albuquerque	0	4.7	44.7	0	40.6	18.8	163.2	0	0	3.4	13.3	33.6	27.0
Austin	....	....	....	2.1	0	1.0	0	1.9	0	3.5	1.7	1.4	1.3
Berkeley	1.5	1.4	0	6.7	0	1.9	2.5	1.2	2.3	0	2.2	1.6	1.8
Charleston	16.8	6.2	3.1	17.2	6.3	9.9	14.4	11.3	1.6	0	8.3	7.1	8.6
East Orange	0	5.0	1.6	4.7	3.1	2.9	5.0	0	2.9	0	0	1.1	2.0
Madison	2.1	2.0	3.9	7.6	0	3.2	0	0	0	0	3.1	0.7	1.8
Racine	1.6	4.7	18.7	1.5	3.0	9.7	1.5	4.4	1.5	2.9	5.7	3.2	5.6
Hartford	2.0	4.6	3.2	3.2	6.3	3.9	3.1	3.6	0.6	5.3	0	2.3	3.2
Kansas City	....	....	....	....	....	....	2.5	2.5	1.6	0	2.3	1.8	1.8
New Haven	4.3	8.6	5.5	0	11.1	5.9	3.7	1.2	0.6	0	0.6	1.2	3.6
Syracuse	1.1	8.3	13.3	0.5	6.4	5.9	6.8	4.3	2.8	5.1	2.3	4.2	5.0
Birmingham	14.9	6.8	22.6	10.9	9.8	13.0	12.6	6.1	2.6	7.2	2.5	6.1	9.2
Minneapolis	2.9	4.5	6.5	2.3	2.9	3.8	4.6	1.1	1.3	1.2	1.8	2.0	2.8
Newark	8.0	5.6	3.7	7.1	4.8	5.8	3.4	2.3	4.7	2.2	1.8	2.9	4.3
Portland	0.7	6.0	1.4	3.4	0	2.3	0.3	2.0	0.3	1.3	0	0.8	1.5
Providence	5.7	5.3	21.4	5.6	6.0	8.8	9.1	7.1	2.0	2.7	3.9	4.9	6.8
Rochester	3.5	6.4	7.3	1.9	8.8	5.2	6.4	1.8	3.0	0.6	3.0	3.0	4.0
Seattle	0.6	5.8	1.4	2.6	1.1	2.4	3.6	0	0	0	0.3	1.2	1.8
Washington	2.8	4.5	8.3	3.6	4.6	4.8	5.0	2.7	5.7	4.0	1.8	3.8	4.3
Baltimore	6.1	11.7	9.2	7.6	10.5	9.0	6.9	2.0	8.6	5.5	5.0	3.6	7.3
Boston	2.8	9.0	14.0	4.0	6.7	7.3	3.6	5.1	2.7	3.8	3.0	3.6	5.5
Buffalo	8.6	4.2	5.1	1.8	4.3	4.8	4.6	5.3	2.4	3.6	3.5	3.9	4.3
Chicago	3.6	4.8	2.7	2.7	2.9	3.3	2.4	1.6	2.3	1.9	0.6	1.7	2.5
Cleveland	4.3	6.6	12.2	1.9	5.8	6.1	6.3	3.7	2.4	4.2	1.4	3.6	4.8
Detroit	4.7	6.7	6.6	4.3	5.8	5.6	5.9	2.9	4.0	4.4	2.5	3.9	4.7
Los Angeles	1.5	6.4	1.1	3.0	8.1	4.2	3.8	3.2	1.7	3.0	3.3	3.0	3.5
Los Angeles Co.	....	10.8	4.0	2.9	5.5	5.6	6.6	2.1	2.0	1.3	0.9	2.5	3.7
Milwaukee	3.3	4.2	4.1	2.7	5.2	4.9	7.0	1.4	2.4	2.5	1.9	3.0	3.8
New York	7.2	5.3	3.6	4.6	5.5	5.2	2.5	1.8	3.0	2.0	1.7	2.2	3.7
Philadelphia	6.5	6.8	5.1	1.6	6.8	5.4	4.2	1.2	3.4	2.9	0.5	2.4	3.9
Pittsburgh	9.0	2.4	16.6	2.3	4.6	6.9	3.2	5.4	4.3	3.1	3.9	3.9	5.4
San Francisco	0.5	4.7	1.5	2.3	1.6	2.1	2.4	0.5	1.8	0.8	2.7	1.6	1.9
All 32 cities	5.2	5.9	5.6	3.6	5.3	3.1	1.9	2.3	2.9	2.8	1.9	2.7	3.9

Comparing the case fatality per cents according to the estimated relative completeness of reporting as expressed in ratio of cases to live births we find, as was to be expected, that the cities with the highest ratios of reported cases have the lowest case fatality rates, and *vice versa* (Table XXXIX).

The differences in completeness of reporting would apparently suffice to explain the differences in case incidence and case fatality rates between Groups A and C. (For cities in the three groups and ratios of reported cases to live births see Table XXXIII.)

C. DEATH RATES

All things considered, the death rates for whooping cough, at all ages and for the 5 age groups, are probably less affected by errors of reporting than are case incidence and case fatality rates. These of course vary widely from year to year and for the age groups and for the individual cities in any particular year.

So far as data are available, the death rates for all ages and for the 5 age groups per 100,000 of appropriate populations are given for each year, the two quinquennia and the decennium for each city in Table XL.

Deaths from whooping cough in persons of 15 years of age or older are so rare that death rates of any significance cannot be offered for this group. The experience of the 5 cities for which death rates for whooping cough of more than 0.09 per 100,000 per annum at ages 15 years and over were reported, was as follows:

	Per 100,000
New York City, 1932	0.1
Detroit, 1925 and 1927	0.1
Cleveland, 1926	0.2
Pittsburgh, 1926	0.4
Rochester, 1926	0.4

The summary Table XLI gives the total accumulated experience of the cities so far as death rates can be calculated for the respective age groups and years of the decennium, not all cities being represented in every age group and year in the table, but in no instance less than 23 of the 32 cities being used for each specific age death rate and year.

The reduction in the combined death rates of these cities from the first to the second quinquennium amounted to

37% for children under 1 year of age
46% for children at 1 year of age
41% for those from 2 to 4 years
24% for persons of all ages

TABLE XLI

Age Specific Death Rates for Whooping Cough per 100,000 for All Cities Reporting for the Particular Age Group and by Years 1924–1933

	Under 1	*1 to 2*	*2 to 4*	*5 to 14*	*15 and Over*	*All Ages*
1924	177.4	90.9	13.1	0.7	0.009	5.2
1925	190.5	94.6	16.7	0.7	0.017	5.9
1926	185.3	105.8	19.2	1.0	0.03	5.6
1927	144.1	53.5	11.4	0.8	0.016	3.6
1928	172.7	96.9	15.6	0.7	0	5.3
1924–28	174.0	88.3	15.2	0.8	0.014	5.1
1929	151.2	72.0	12.8	0.7	0.007	1.9
1930	91.3	37.3	8.3	0.4	0	2.3
1931	115.4	55.7	9.5	0.7	0	2.9
1932	104.7	41.3	7.4	0.8	0.02	2.6
1933	79.9	31.9	7.0	0.4	0	1.9
1929–33	108.6	47.8	9.0	0.6	0.006	2.7
1924–33	141.4	68.2	12.1	0.7	0.01	3.9

If we select those cities which had for the entire 10 year period an average death rate from whooping cough for particular age groups, and for all ages, lower than the average and well below most of the other cities we find some cities with rates in each age category that appear frequently in the lists. It may be supposed that some favorable conditions, accidental or determined by medical and public health services share in the causation of these lower rates in particular cities.

TABLE XLII

Cities with Death Rates of less than 100 per 100,000 Under 1 year		*Cities with Death Rates of less than 50 per 100,000 1 year*		*Cities with Death Rates of less than 10 per 100,000 2 to 4 years*	
East Orange	99.7	Chicago	46.6	Los Angeles Co.	9.3
Minneapolis	96.3	Los Angeles Co.	43.9	Milwaukee	8.8
Madison	96.0	Berkeley	33.2	Chicago	7.8
New Haven	88.1	San Francisco	32.7	Buffalo	7.1
Chicago	82.9	Seattle	23.9	Berkeley	6.7
Seattle	79.9	Madison	11.1	Seattle	6.6
Berkeley	69.4			Madison	0
				East Orange	0

If we may be allowed to offer conjectures to explain the apparent superiority of experience of these cities in the matter of death rates from whooping cough, the following will serve perhaps a provocative purpose.

As to Berkeley, Seattle, Los Angeles County, and San Francisco, the favorable experience of these cities in respect to incidence of and mortality from childhood pneumonia may be the most important factor, as this is the chief cause of death in whooping cough. Coupled with this is the evidence of a very high reporting ratio of whooping cough in Berkeley (54.1 per cent ratio to live births), and better than the average ratio of the 32 cities, in the other 3 cities.

Reporting of the disease is at a higher ratio to births in East Orange than in any other of the 32 cities (63.9 per cent) and the cities of Madison, Buffalo, Milwaukee, New Haven, all have a ratio of reporting above the average of the 32 cities, and where reporting is good there appears to be more effective service for protection and care of patients with the disease than where reporting is neglected.

As for Chicago and Minneapolis, there is neither favorable climatic environment nor the evidence of good reporting of whooping cough, the ratio of cases of this disease for the 10 year period in Chicago being 7 per cent and in Minneapolis 5.4 per cent of live births in the same period. It may be that there is some particular excellence of visiting nurse service or of medical attention for whooping cough patients in these cities, but this does not appear from the statements received from the health officers of these cities.

In only 3 of the 27 cities giving death rates for whooping cough in children under 1 year of age (Albuquerque, Hartford, and Buffalo) was the death rate higher in the second than in the first quinquennium.

For children between 1 and 2 years of age the death rate was lower in the second than in the first quinquennium in all but 2 (Albuquerque and Seattle)

of the 26 cities for which data were available.

For children from 2 to 4 years of age the death rate was lower in the second than in the first quinquennium in 21 of the 26 cities for which data were available, and was higher in 3, and in 2 cities there were no deaths from whooping cough in this age group in either of the two quinquennia.

Comparisons of rates for older age groups are unprofitable because of the rarity of deaths from whooping cough in persons 5 years of age or over.

With the exception of Albuquerque and Austin, all of the 32 cities reported a lower death rate from whooping cough for persons at all ages in the second than in the first quinquennium.

But even if the changing birth rate and varying degrees of administrative intelligence and thoroughness of service could be demonstrated to be statistically significant factors in determining the differences among the death rates from measles and whooping cough in the 32 cities studied, we should bear in mind some other factors which may explain at least part of the reductions in case fatality and death rates in the past 10 years.

Changes in the size and constitution of the average family unit, and changes in the ratio of persons to rooms in dwelling places in the past few decades have been marked.

While there is no recent study of equal adequacy and accuracy for the United States there is much circumstantial evidence to persuade us that the same phenomena have been occurring in this country as are so strikingly disclosed in the article, The Size, Constitution, and Housing Standards of the Family in England and Wales, 1911 to 1931, by J. W. Nixon in the *Revue de l'Institut International de Statistique*, 3 Annee livraison 2, pp. 142–162.

Briefly, the facts appear to be that the size of the private family in England and Wales has changed from a unit of 4.58 persons in 1891 to one of 3.72 in 1931, or a reduction of about 15 per cent, the reduction in 1911–1931 being nearly 3 times that estimated for the period 1891–1911.

Also the "mode" or most frequent family in 1931 was one of 3 persons, and second to this in frequency was a family of 2, 3 person families accounting for 24 per cent of all families in 1931, as against 19 per cent in 1911. The total number of families increased 30 per cent but those of 5 persons declined by 13 per cent during the period 1911–1931.

Families increased in number by 29 per cent while the population increased but 10 per cent.

The average number of rooms occupied by a family in 1931 was 4.5 (*i.e.* 4 and 5 room dwellings constituting 50 per cent of all dwellings).

The incidence of overcrowding, *i.e.*, more than 2 persons per room, declined from an involvement of 5.64 per cent of the population in 1911 to that of 3.88 per cent in 1931.

In 1931, 77 per cent of the families included a married couple, and less than half of these families had children under 10 years of age. Of the 23 per cent of families with no married couple, only 1.19 per cent had children under 10.

The average number of children under 14 years of age in England and Wales declined from about 1.25 per family to 0.83 between 1911 and 1931.

Without comparable information for the 32 cities of our study, no such precise statements of demographic and sociologic changes can be referred to but there are many indications that the same tendencies are operative in the United States although perhaps to a less marked degree.

Whatever factors operate to reduce the number of persons per family, and

particularly the proportion of young children to adults in the family group, may properly be thought of as in some degree delaying the age of incidence of measles and whooping cough and thus directly contributing to a decline in the case fatality and death rates of these diseases.

VIII

CONSIDERATION OF SOME GENERAL FACTORS POSSIBLY AFFECTING INCIDENCE AND DEATH RATES FOR MEASLES AND WHOOPING COUGH IN DIFFERENT CITIES DURING THE DECADE 1924–1933

As has been intimated in the preceding text, an attempt to draw inferences as to superior worth of particular protective or preventive procedures intended to reduce the cases or deaths from measles or whooping cough, on the basis of differences in the incidence and case fatality rates of the several cities or groups of them, leads nowhere unless it be to the conclusion that the reporting of these diseases is incomplete in all but a few of the cities, which introduces a large variable factor making comparability unreliable.

It should be kept in mind that in such communities as East Orange and Berkeley with an exceptionally high proportion of people of education and sense of responsibility, owners of their own homes, and alert to the best interests of their children, reporting of the notifiable diseases by the family physicians is likely to be more nearly complete than in other and less favored communities.

If, however, we use the more usual though perhaps a cruder index of death rates, for whatever age group, we find some striking consistencies between what appear to be relatively complete reporting of the incidence of either disease and lower death rates, and *vice versa*.

While the generally lower incidence rates per 100,000 of the total, or age group populations under 15 years of age, can be explained inferentially by the reduction in the birth rate during the 10 year period, with the consequent effect of a smaller percentage of the population living within the susceptible age groups, particularly under 5 years of age, this cannot be properly offered as the only explanation of distinct differences among the cities in the age specific death rates from measles and whooping cough.

IX

DATA INDISPENSABLE FOR MORE ACCURATE ANALYSIS OF THE EXPERIENCE OF CITIES

The major cause of embarrassment in the use of records of cases and deaths of measles and whooping cough is the lack of uniformity and continuity of tabulation of cases and deaths by desirable age groups.

In the interest of determining the actual value of procedures intended to mitigate or reduce damage from these two diseases, complete reporting, exact determination of diagnosis, and record of the age of the patient are indispensable.

X

TENTATIVE SUGGESTIONS FOR A BETTER USE OF EXISTING KNOWLEDGE TO REDUCE LOSS OF LIFE FROM MEASLES AND WHOOPING COUGH BY HEALTH DEPARTMENT PROCEDURES

The primary and specified object of this study was to discover evidence, which it was presumed might be available, from which the worth of the various features of commonly practical control procedures might be measured in some quantitative manner so that reduction in loss of life from measles and whooping cough might be the better assured. While information in abundance has been obtained as to a variety of control procedures practised among the 32 cities, the usefulness of this has proved to be negligible because of the lack of uniformity and completeness in reporting cases of measles and whooping cough and the rarity with which case incidence is tabulated or available by age groups comparable with those used in tabulating deaths.

Reduction in incidence and death rates from these two diseases for the population of these cities, at all ages, has been considerable in amount, and general among the cities. The explanation appears likely to be found more in social changes in the population than in improvements during the 10 year period in the administrative measures designed for prevention and control.

Nevertheless, there seems to be little doubt that further reduction in the death rates from these diseases can be achieved by a more consistent and thorough application of existing knowledge, and for this reason the following practices are recommended to health officers, as practicable and useful, particularly in urban communities.

A. MEASLES

The following procedures are believed to be desirable in the expectation that if they are consistently used, postponement of the age at which measles will be acquired and a consequent reduction in the case fatality and death rate from the disease will result.

Reporting of every case of measles by telephone as soon as the diagnosis is established, or suspected for good and sufficient reason, is important and should be required.

Verification of the diagnosis by a physician representing the department of health at the request of the reporting physician, and in any instance where the source of the report of the first case in the family is non-medical, viz., nurse, school teacher, parent, guardian, or institution representative, should be provided for.

Visits of instruction and observation should be made for the purpose of effective establishment and continuance of isolation, where the case reported is under 5 years of age or where there is an exposed child under 5 years of age in the household with the reported patient.

These visits should be as soon as practicable after the receipt of the report of a case of measles in a child under 5 years of age or in an older child if there is an exposed susceptible under 5 in the family or household, in all instances by a health department nurse, supplemented, where no physician is in attendance or if the conditions in the home seem to require it, by a visit of a physician representing the department of health.

There is benefit to be expected where the patient is a child under 5 years of age if two subsequent visits are made to such cases by nurse or physician of the department of health, one on the 5th day from appearance of the rash

and one a week later, to make sure that convalescence is established without pulmonary or other complication, and to impress upon the family the need of nutritional up-building and a hygienic way of living for the child, with a careful examination of the chest not later than 3 months after recovery, if necessary with X-ray.

More frequent calls during the communicable stage of the disease and where convalescence is delayed, should be made by a nurse of the department of health where ignorance, lack of coöperation, or other similar unfavorable conditions characterize the family care of the patient and there is failure to observe isolation requirements.

The visiting of measles cases by nurses experienced and supervised in giving bedside care to the sick should be approved and encouraged by the department of health in all cases of the disease, especially in children under 5 years of age where there is any doubt as to the skill and understanding of the mother, guardian, or other attendant of the child in the necessary precautions to be taken and the technics to be used in the care of the sick child and the protection of other members of the household, particularly susceptible children under 5 years of age.

Hospitalization of the patient in a hospital or ward for communicable disease by requiring removal of a child under 5 from the home should be only for urgent surgical conditions requiring operative treatment, or where the patient is in a hotel, or boarding house, or in a home where the environment cannot be made sanitary and suitable for the care of the sick.

Removal of a young child to a hospital with a pneumonia complicating measles is often dangerous to the child.

A placard should be placed on the door of the house or individual apartment of a multiple family dwelling wherever the case is visited by a physician or nurse of the department of health, to warn visitors against intruding, more in the interest of the patient than with the expectation that this warning sign will have any material effect in reducing exposure to the disease.

The isolation period for a case of measles in which there is no complicating purulent discharge from nose, throat, or ear, need not be more than 5 days from the appearance of the rash.

The isolation procedures or aseptic medical nursing and concurrent disinfection of discharges should be continued until discharges of nose, throat, and ears have ceased.

It is rare to find a child with measles who does not benefit by bed care and good nursing for at least a week and often longer after the termination of the period of communicability for which the isolation is required.

Release from isolation should be by the authority of the health department on the request of the attending physician, but in no instance earlier than 5 days after the appearance of the rash.

At the termination of the isolation period the family physician or health department nurse should advise the family to clean the room occupied by the patient thoroughly and give it a good airing and if possible sunning, without attempting any fumigation, which should not be required.

Quarantine of adult members of the family or household need not be required, regardless of their occupations or avocations.

Children of any age who are known by the attending physician or the health officer to have had measles need not be quarantined.

Children of school age who are not known to have had measles should be observed daily for any appearance of catarrhal symptoms of eyes, nose, and

throat, and where practicable their temperatures should be taken morning and night. On the appearance of significant catarrhal symptoms, Koplik spots, or a mouth temperature of 99.4 or over, a child should be considered as a case of measles, and be reported to the health department and be isolated accordingly.

If the date of exposure to the first case of measles in the household or to another source of infection, is known with reasonable exactness, an exposed and presumably susceptible child of school age may be allowed to attend school for the first 7 days after exposure, but be excluded from school for the next 7 days.

Children of the household under school age and presumed to be susceptible, should be observed daily for 2 weeks with a view to detecting the disease at its onset by the presence of catarrhal symptoms or a rise of temperature; but otherwise these young children should be allowed their usual liberties.

When a case of measles appears in a home where there is also a baby or other young child not yet infected or known to have been exposed, such infant or young child should be taken immediately to the home of the grandparents or other relatives where there are no susceptible children, and thus be kept away from opportunity of infection during the isolation of the patient.

Exclusion of exposed susceptible children of school age and school teachers from school for 1 week from the 7th day after the last date of presumed exposure may be justified where the community has been but recently invaded by measles and the disease has not become prevalent, as in some small cities and in sparsely settled rural communities where the school is one of the few places of common meeting of children. Under similar conditions it may occasionally appear justified to exclude susceptible children from public gatherings for 2 weeks.

Closing schools in the expectation that this will materially affect the spread of measles is inadvisable in general, and quite unproductive of results in cities, although the closing of nursery school classes, and kindergarten, and the first two grade classes where the highest incidence of susceptibles will be found, may be undertaken with beneficial results at the onset of an epidemic wave, and in small cities and rural population groups.

Institutions for children and hospital wards for children, especially those for infants, should be quarantined where exposure is suspected, and should always be closed to visitors under 16 years of age when measles is prevalent in the community, and preferably as a rule at all times.

Passive immunization should be advised and, when necessary, provided by the department of health for exposed presumably susceptible children under 5 years of age if the suspected or known exposure was not more than 7 days earlier.

Pooled convalescent serum in doses of 12 c.c. to 15 c.c. according to the age or weight of the child should be used if available; otherwise citrated whole adult blood of one or other of the parents of the child should be used in doses of 20 c.c. to 30 c.c., appropriate to the age or weight of the child. Citrated blood allowed to stand overnight may have plasma drawn off and given in amounts similar to doses of citrated whole adult blood.

Passive immunization should be made available by the department of health also for exposed susceptibles among the aged (persons of 70 years of age or over), persons at any age affected with valvular disease of the heart, expectant

mothers in the last month of pregnancy, and for all susceptible contacts in institutional outbreaks of measles, especially in institutions for children.

The so-called therapeutic use of convalescent measles serum or whole blood of presumed or known immunes is advised for toxic cases.

Children under 16 years of age, on admission to an institution for their domiciliary care, should be held for a period of 2 weeks' observation before they are allowed to share in the life and contacts of the children already in the institution.

New admissions of children to a domiciliary institution should not be permitted if a case of measles exists in the institution, or when measles is widely prevalent in the general population, unless the new admission is presumed to be immune as the result of recovery from an attack of measles.

Protection of children under 5 years of age and particularly those under 2 years of age, against exposure to the disease by isolation procedures and the establishment of passive immunization, or at least a modified attack of the disease if infection has already occurred, together with good medical and nursing care of cases of measles at these early ages will accomplish a reduction in the case fatality per cent and thus of the specific death rate from measles.

There is no reason to believe that any procedures at present used or considered practicable can be relied upon to reduce the incidence of measles in terms of the entire population over a period of years, since this disease is known to attack practically all susceptible persons at whatever age exposure first occurs.

Investigation of the source of infection of a reported case of measles is rarely profitable unless the disease has just appeared in a community and the community is small and relatively isolated, or when it appears in an institution.

Such investigation as will prove valuable is through search by nurses of the department of health for exposed susceptible children under 5 years of age, with a view to their prompt passive immunization, and for the discovery of unreported cases in young children so that suitable care may be provided for them during their sickness and convalescence.

The efforts of the department of health as well as those of the family physician, the family, and the visiting public health or bedside nurse, should be directed toward postponing the age at which a child is first exposed to measles at least until it is 6 years of age, and if the child is a cardiac or other form of chronic invalid until later years.

Coincident with and as a natural result of successful efforts to postpone the age of the attack of measles in children there will be some slowing of the rate of spread of the disease through the community, with the effect of having fewer persons sick at one time, and probably better care of those who are attacked. Such delay in the progress of the disease among the susceptibles of the community may postpone the development of a considerable number of the expected cases until warmer weather with a probable reduction in the number of instances of complicating pneumonia.

Next to this objective in importance is securing for each young child (under 5) known or suspected to have been recently exposed to measles the benefit of passive immunization prior to the 5th day after exposure, for complete prevention of the threatened immediate infection, or between the 5th and the 7th day for the development of a mild though immunizing attack of the disease.

The third objective should be to se-

cure for each known case of the disease in children under 5 years of age such good medical and nursing care as may be needed by the character of the sickness of the particular child, and for the establishment of a complete convalescence.

For all these purposes an approximately complete reporting of the disease as soon as it is suspected or certainly determined, is indispensable.

The simplest reliable method for the health officer to determine to what degree reporting of measles is incomplete in his community is to compare the total reported cases of measles for the last 10 years with the number of live births recorded for the same population for the same period of time.

If the average infant mortality for the 10 years has been between 50 and 75, it is to be expected that the total cases of measles over a 10 year period (except in isolated and scattered rural communities in which a longer period must be used) will amount to about 80 per cent of the total live births recorded for the same period.*

The effective distribution among the physicians and the laity of informative leaflets dealing with the essential facts of measles incidence, its spread, protection against it, and treatment of those who have the disease, can be of material aid in bringing about more nearly complete reporting of cases, and suitable medical and nursing care, particularly of patients under 5 years of age with measles.

* In a city of relatively stable population not exhibiting any extremes or eccentricities of growth, it is possible to arrive at a more accurate estimate of probable degree of completeness of reporting of measles by tabulating deaths under 10 years of age by actual age at death and subtracting these from the number of reported births for the appropriate year. This permits a determination of the number of children at any year of age that are alive in subsequent years. By comparing the number of children reported as having had measles with the number of children known to be living at the corresponding age a reasonably exact statement can be made as to the percentage who have developed measles in a given year or period. The application of this method by the health officer of Racine indicates that the percentage of completeness of reporting of measles in that city is nearer 75 per cent than 95 per cent, the latter being estimated on the relationship between total births reported over a 10 year period and the number of cases of measles reported in the same period.

B. WHOOPING COUGH

The objectives in the application of procedures by the health department for the reduction of sickness and death from whooping cough are similar to those in the case of measles, viz., to prevent exposure of children in the first few years of life to known cases of this disease, to make sure that when infected, children at ages under 5 years receive medical and nursing care suitable to their needs, and possibly to reduce the number of susceptibles at these ages by immunization procedures, especially among those known to have been exposed or likely to be unavoidably exposed.

By appropriate and consistent application of the following recommended procedures, the case fatality and death rates from whooping cough can probably be further reduced.

Reporting of whooping cough by telephone or mail on the day of recognition or suspicion of the disease, should be required, and those found to have neglected this necessary formality should be called to account, and if the violation of regulations is flagrant, or has been repeated, disciplinary action, as by a nominal fine, should be made effective.

Verification of the diagnosis by laboratory methods should be at the disposal of physicians requesting it, and be used by the department of health to determine the identity of catarrhal affections suspected to be whooping cough in the pre-paroxysmal stage, whether in institutions or among other groups, particularly of young children.

In all instances where the first case in a family is reported by others than physicians, *e.g.*, nurses, school teachers, parents, or representatives of institu-

tions, a physician from the department of health should establish the diagnosis by clinical or laboratory means or both.

It is not expected that the differential blood count will be offered as a laboratory aid for diagnosis of whooping cough by the health department, but it is desirable that the technic of plate culture of the *Hemophilus pertussis* be offered to the attending physician, and be at the disposal of the health department diagnostician as an aid in the discovery of cases in the pre-paroxysmal stage, and to establish the diagnosis in those patients who do not at any time in the course of the disease exhibit the characteristic whoop.

A visit of instruction and observation by a nurse or physician should be made as promptly as possible after notification of the case (when the report has been from a non-medical source and a physician of the department has verified the diagnosis) to make sure that isolation is established and its purpose and duration are understood by the family.

If there is a physician in attendance and the patient is over 5 years of age, and there is no susceptible contact in the household under 5 years of age, the visit of instruction and observation may not be necessary.

Visits of instruction and observation by a health department nurse in all cases of whooping cough in children under 5 years of age, should be repeated once a week for 4 weeks in all instances and for a longer period if the convalescence is complicated or prolonged, to make sure that the isolation is maintained for the 4 weeks from the onset of the paroxysmal cough, and that the child receives suitable care. At the last visit, the family should be advised to have a careful medical examination made of the patient's lungs, if necessary with X-ray, not later than 3 months after the date of release.

Bedside nursing of whooping cough patients by visiting nurses experienced and supervised in such work, should be not only permitted but be actively encouraged by the department of health, especially where the patient is a child under 5 years of age, unless the family physician in attendance is satisfied that the care of the patient by the family is in all respects adequate. The younger the patient, the more necessary is expert nursing attendance particularly if pneumonia develops or there is a serious interference with the child's nutrition.

Hospitalization in a hospital or ward devoted to the care of communicable disease may be required if the patient is found in a hotel, boarding house, institution for children, or where the home conditions are unsuitable for care of the patient, especially if some serious complication of a surgical nature arises which cannot be cared for properly at home.

Hospitalization should not be required except in the interest of the patient, and to avoid exposure of susceptible contacts among young children who cannot be otherwise protected.

Infants with a complicating pneumonia do not tolerate well transfer to a hospital in the course of the disease.

A placard should be placed on the door of the house or separate apartment of the whooping cough patient wherever the case is visited by a physician or nurse from the department of health, to warn visitors to keep out, in the interest of the patient quite as much as to protect the public. This should be done at the time of the first visit of the nurse or physician from the department of health. Removal of the placard or warning notice should be on the authority of the department of health at any time after 4 weeks from the onset of the paroxysmal cough, provided the attending physician has reported the patient as recovered.

The isolation period should extend from the onset of the catarrhal symptoms, which is usually 1 week or 2 to recognition of the disease and notification, to 4 weeks after the appearance of the paroxysmal cough. Persistent cough with or without the "whoop" beyond the 4 week period does not justify or require an extension of the isolation, but rather such freedom for convalescence out of doors as will best contribute to the early and complete recovery of the patient.

On the termination of isolation the family should be instructed by the attending physician or by a nurse from the health department as to the thorough cleaning of the room and its airing and sunning before it is again used. Fumigation should not be required.

Quarantine of adult members of the family or household regardless of their occupations is neither necessary nor desirable. Children of school age who are not known to have had whooping cough should be excluded from school and public gatherings for 2 weeks from their last exposure to a recognized case of the disease, unless during this period such children are observed daily by the physician or nurse attached to the school health service, on the arrival of the child at school, to determine freedom from symptoms or signs of catarrhal manifestations of the respiratory tract.

Children of the household under school age, presumed to be susceptible, should be observed carefully throughout the course of the communicable stage of the patient, and for 2 weeks after the isolation precautions have been terminated, to detect any catarrhal manifestations of the respiratory tract. A susceptible child in the family or household with the patient developing any catarrhal symptoms or a persistent unproductive cough should be presumed to be infected, and be treated as a probable case of whooping cough, unless laboratory evidence, as by plate culture of bronchial secretions, or negative leucocyte count controverts this assumption.

When a case of whooping cough appears in a home and there is a baby or other young child in this home not yet infected or known to have been exposed, such infant or young child should, if at all practicable, be immediately taken to the home of the grandparents or other relative where there are no susceptible children and thus be kept away from opportunity of infection during the isolation of the patient.

Closing schools in the expectation that this will materially affect the spread of whooping cough is not to be recommended in general, and appears to be quite unproductive of beneficial results particularly in cities, and when the disease is at all prevalent. However, the closing of classrooms attended by nursery, kindergarten, or first two grade children for a period of 2 weeks, particularly at the onset of an outbreak of whooping cough in a community, and more especially if the community is small and relatively isolated, may prevent the spread of the disease at that particular time among those children who are likely to be susceptible and to be severely affected by the disease.

Institutions and hospital wards, particularly those devoted to infants, should be closed to visitors under 16 years of age when whooping cough is prevalent in the community, and preferably as a rule at all times.

Artificial active immunization by pertussis vaccine, and passive immunization by the use of convalescent serum, and whole blood of immune adults, are undergoing extensive trial. At the present time such tests of effectiveness as are sponsored by appropriate public or private agencies or institutions should

be encouraged, and where practicable be carried on by the department of health. Uncertainty as to results, and lack of uniformity in methods used, require caution in recommending routine or universal application of immunization against whooping cough as a reliable means of protecting susceptible children under 5 years of age against exposure in the home, under institutional conditions, or in the public at large, although some promising results have been reported. Decision as to the efficiency of immunization against whooping cough, and the method to be used should be left to the physician in his family or institutional relationship.

The health department should facilitate, where it does not actually undertake, experimental procedures for immunization by provision of materials of reliable character, by keeping records of incidence of infection among those in whom immunization has been attempted and in general by epidemiological studies of results.

The therapeutic use of whooping cough vaccines or other biological products of a putative specific value is not to be encouraged by health departments, nor should such materials be supplied by the department except with the clear understanding on the part of the physician to whom they may be offered, that favorable results cannot be guaranteed, and have not yet been definitely demonstrated or corroborated. Experimental therapeutic use of such products should be limited chiefly to hospitals especially equipped by experience and personnel to judge of their worth among patients under careful clinically controlled conditions.

Institutions for the domiciliary care of children under 16 years of age should be required to hold all new admissions for an observation period of 2 weeks before allowing them to share in the life and contacts of the children already in the institution.

New admissions to such institutions should not be permitted if there is a case of whooping cough in the institution, or when whooping cough is prevalent in the community, unless the applicant is presumed to be immune by reason of recovery from an attack of this disease.

Investigation of the source of infection should be made to discover undiagnosed and unreported cases of whooping cough in the hope of protecting young children against exposure and in this way reducing the mortality. The long period of communicability, the uncertainty of the beginning of communicability, the occurrence of cases with positive plate culture findings of the specific infecting organism in which the characteristic whoop does not develop at any time, the duration of the paroxysmal cough often for several weeks or months beyond the time when the infecting organism can be recovered from bronchial or laryngeal secretions, and the incompleteness of notification of the disease by physicians and others, all combine to make difficult the tracing of the source of infection or controlling the epidemic spread or endemic prevalence of this disease.

Epidemiological investigation of cases of whooping cough is rarely profitable unless the disease has recently appeared in a community and the population group is small and relatively isolated, or the case has developed in an institution.

Such investigation as is most likely to be profitable is search, by nurses of the department of health, for exposed susceptible children under 5 years of age for whose protection separation from known sources of infection may be practicable, and to discover unreported cases in young children for whom suitable medical and nursing care may be obtainable.

Education of the laity and the professions concerned with the care of the sick, in the fundamental facts as to the cause, means of communication and necessity for reporting, isolation and good care during illness when whooping cough appears in the community, is a primary obligation of the department of health.

Without approximately complete reporting of cases of whooping cough, little can be done by the department of health which will have any practical effect in lowering the case fatality and death rate from this disease.

A relatively simple way by which the health officer can determine the extent to which whooping cough is reported in his community is to compare the cases reported with total births reported, both for a consecutive 10 year period.

If the infant mortality rate in the community is between 50 and 75 per 1,000 living births it will be found that, if whooping cough cases are reported at all ages with approximate completeness, there will be about 60 cases of the disease reported over a 10 year period for each 100 live births reported for the same period of time.

By insistence upon prompt and complete reporting of whooping cough and attention to protection of children under 5, and particularly those under 3 years of age, against exposure, and making certain of suitable medical care for those sick with the disease in these early years of life, there can be achieved a reduction in the case fatality and in the death rate from whooping cough, without assurance of any drop in the prevalence of the disease.

APPENDIX

(Questionnaires used in collecting information)

November, 1934.

COMMITTEE ON EVALUATION OF HEALTH DEPARTMENT PRACTICES OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

Study of Procedures, Policies and Experience in the Control of Measles of the City of .....: Health Officer .....

Members of the Committee:

Carl E. Buck — Joseph W. Mountin
Charles V. Chapin — John L. Rice
Louis I. Dublin — Henry F. Vaughan
Allen W. Freeman — W. F. Walker

Haven Emerson, *Chairman*
630 West 168th St., New York, N. Y.

I. *Reporting of cases of measles to the Department of Health*

A. Is reporting required? (check) Yes.....No.....By mail.....By telephone.....
On day of diagnosis.....Later.....

B. What is probable per cent of cases reported?.....

C. If reporting is required, please complete the following table, so far as records permit.

REPORTED CASES OF MEASLES

Year	*Total*	*Under 1 yr.*	*1 year & under*	*2 yrs. & under 3*	*3 yrs. & under 4*	*Under 5*	*5 yrs. & under 15*	*15 yrs. & over*
1924								
1925								
1926								
1927								
1928								
1929								
1930								
1931								
1932								
1933								

DEATHS FROM MEASLES

Year	*Total*	*Under 1 yr.*	*1 year & under*	*2 yrs. & under 3*	*3 yrs. & under 4*	*Under 5*	*5 yrs. & under 15*	*15 yrs. & over*
1924								
1925								
1926								
1927								
1928								
1929								
1930								
1931								
1932								
1933								

II. *Verification of cases reported*

A. Is the diagnosis verified by a physician of the department of health?
(check) Yes..... No.....

III. *Investigation of cases reported*

A. Is a visit of instruction and education made at the home on receipt of report of a case of measles (check) Yes..... No..... If yes: By physician..... By nurse..... By sanitary inspector.....; On day of receipt of report..... Later.....

IV. *Calls upon cases during period of isolation*

A. Is case followed up during period of isolation? (check) Yes..... No.....

B. If so, during what period are visits made?.....
How many visits are usually made on each reported case?.....

C. Please complete the following table so far as records permit.

Total number of calls to measles patients during the year by a representative of the department of health

Year	*Physician*	*Nurse*	*Sanitary inspector*	*Other (Specify)*
1924				
1925				
1926				
1927				
1928				
1929				
1930				
1931				
1932				
1933				

D. If call is made by nurse of the department of health, is bedside nursing care given? (check) Yes..... No.....

V. *Calls after release of patient from isolation*

A. Is visit made after release of patient from isolation? (check) Yes..... No.....
If yes, at what interval after release from isolation?.....

VI. *Placarding of premises*

A. Is home of patient placarded? (check) Yes..... No..... Remarks .....

VII. *Isolation* (of patient only)

A. What is type of isolation? (check) Absolute..... Modified..... None.....

B. What period of isolation is required by local or State sanitary law or ordinance? (specify).....days
Please quote the provision of the existing sanitary code requirement or regulation
.....
.....

C. Who has authority for release from isolation? (check) Family physician .....
Health officer ..... School physician ..... Nurse ..... Other—(specify) .....

D. Has there been any change in isolation procedure during the years 1924–1933?
If so, please describe it .....
.....
.....

VIII. *Quarantine*

A. Is quarantine required for members of household? (check) Yes ..... No .....

B. If required, to whom does quarantine apply? (check) Children below school age ..... Children of school age ..... Adults .....

C. If there has been any change in quarantine procedure during the years 1924–1933 please describe it .....
.....
.....

IX. *Hospitalization*

A. Under what conditions is hospitalization required by the department of health? (check) Unsanitary conditions ..... Residence of patient in boarding house ..... Other (specify) .....

B. Is hospitalization encouraged by the department of health? (check) Yes ..... No .....

C. If encouraged, for what reasons? (check) Children under 5 years of age ..... Other children ..... Adults .....

D. Please complete the following table, so far as records permit.

Year	*No. of measles patients hospitalized during communicable stage*
1924	
1925	
1926	
1927	
1928	
1929	
1930	
1931	
1932	
1933	

X. *Immunization*

A. Is passive immunization of contacts recommended by the department of health? (check) Yes ..... No .....

B. If recommended, for what persons? (check) Children under 5 years of age ..... Other children ..... Adults .....

C. If recommended, is immunizing serum or blood provided by the department of health? (check) Yes ..... No .....

D. Is immunizing serum or blood available for free use? (check) Yes ..... No ..... Available to all persons? ..... Available to certain age groups only ..... (specify) ..... Available to certain other classes of persons only (specify) .....

E. What is the method of immunization? (check) Whole parent blood, direct ..... Whole parent blood, citrated ..... Convalescent serum ..... Other (specify) .....

F. In what year was immunizing serum or blood first made? .....

G. Is therapeutic use of immunizing serum or blood encouraged by the department of health? (check) Yes ..... No .....

XI. *Services of visiting nurse association*

A. Are visiting nurses allowed to visit measles patients for bedside care? (check) Yes ..... No .....

B. If this is allowed, is such visiting nurse service for bedside care encouraged by the department of health? (check) Yes ..... No .....

C. Please complete the following table so far as records permit (see note).

Year	*Measles patients known to have been attended by visiting nurses for bedside care*
1924	
1925	
1926	
1927	
1928	
1929	
1930	
1931	
1932	
1933	

Note: Information under this heading can probably be best obtained from ..... of your city.

XII. *Standard practice of immunization and isolation in regard to children in institutions*

A. Is an observation period required on admission of children to institutions for domiciliary care of children? (check) Yes ..... No .....
If so, what is length of observation required? .....

B. If immunization of child contacts required on appearance of measles in an institution for children? (check) Yes ..... No ..... If so, state method used .....
.....

C. If there is other standard practice, please describe it .....
.....

Signed: Name .....
Title .....
Date .....

Please return the questionnaire with answers and records as soon as practicable to Dr. Haven Emerson, 630 West 168th St., New York, N. Y.

The questionnaire on whooping cough was identical in form and matter with the one for measles with the following additions or differences in phrasing.

II. Verification of cases reported

B. Is the plate culture method used for the diagnosis of whooping cough patients? (check) Yes..... No .....: for the release of whooping cough patients? Yes..... No.....

VII. Isolation

E. Is a warning armband used on patients allowed outdoors during communicable period of disease? (check) Yes..... No.....

X. Immunization

A. Is active immunization of contacts by whooping cough vaccine recommended by the department of health? (check) Yes..... No.....

B. If recommended, for what persons? (check) Children under 5 years of age .....
Other children ..... Adults .....

C. If recommended, is whooping cough vaccine provided by the department of health? (check) Yes ..... No .....

D. Is passive immunization by convalescent blood or serum recommended by the department of health for susceptibles exposed to whooping cough? (check) Yes ..... No .....

E. In what year was an immunizing procedure introduced? ..... What was the type of immunization? (check) Active ..... Passive .....

LIST OF MEMBERS
AMERICAN PUBLIC HEALTH ASSOCIATION

THIS list includes all members of the American Public Health Association in good standing as of June 1, 1937. It also includes the names of applicants for membership whose applications were received up to May 10, 1937.

The number of members by classification is listed below:

Fellows	1,010
Members	4,196
Honorary Fellows	16
Sustaining Members	14
Affiliated Societies	16
Life Members (included in above)	(150)
Total	5,252

The following symbols are used to indicate the various classifications:

No symbol	Members
*	Fellows
**	Honorary Fellows
††	Sustaining Members
†	Affiliated Societies

Section affiliations are indicated as follows:

(H)	Health Officers Section
(L)	Laboratory Section
(V)	Vital Statistics Section
(En)	Public Health Engineering Section
(I)	Industrial Hygiene Section
(F)	Food and Nutrition Section
(C)	Child Hygiene Section
(Ed)	Public Health Education Section
(N)	Public Health Nursing Section
(Ep)	Epidemiology Section

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PRELIMINARY PROGRAM

SIXTY-SIXTH ANNUAL MEETING

American Public Health Association

NEW YORK, OCTOBER 5-8, 1937

THE AMERICAN PUBLIC HEALTH ASSOCIATION
50 West 50th Street New York, N. Y.

PRELIMINARY PROGRAM OF THE SIXTY-SIXTH ANNUAL MEETING AMERICAN PUBLIC HEALTH ASSOCIATION

NEW YORK, N. Y., OCTOBER 5–8, 1937

THE Annual Meeting Program Committee presents the Preliminary Program of the scientific sessions of the Sixty-Sixth Annual Meeting of the American Public Health Association and information concerning meetings of related organizations.

This program is incomplete and perhaps inaccurate in some respects. The affiliations of speakers have been omitted, but will be published in full in the Final Program. Delegates are urged to consult the Final Program, available at the Registration Desk in the Pennsylvania Hotel at the time of the meeting.

Tuesday, 9:30 A.M.

HEALTH OFFICERS

First Session—Banquet Room, Pennsylvania Hotel

THE HEALTH DEPARTMENT IN THE FIELD OF MEDICINE

From the Standpoint of a Health Official. JOHN L. RICE, M.D.

From the Standpoint of a Private Practitioner. FLOYD S. WINSLOW, M.D.

Discussion. JOHN A. FERRELL, M.D., DR.P.H., and ROBERT H. RILEY, M.D.

VITAL STATISTICS

First Session—Parlor 1, Pennsylvania Hotel

The Physician's Statement of Cause of Death. A. HARDISTY SELLERS, M.D., D.P.H.

The Adaptation of the International List of Causes of Death to the Changing Needs of the Medical Profession and Public Health Groups. HALBERT L. DUNN, M.D., PH.D.

What Should Be Taught to Students in Medical Schools in Regard to Vital Statistics. THOMAS J. LEBLANC, SC.D.

Report on "Underreporting by Physicians." (Sub-Committee of the Committee to Study Death Certification.) HUGO MUENCH, JR., M.D., DR.P.H.

Report on "Effects of Changing Form of Certificate." (Sub-Committee of the Committee to Study Death Certification.) *Chairman,* THOMAS J. DUFFIELD.

Tuesday, 9:30 A.M.

INDUSTRIAL HYGIENE

First Session—Parlor 2, Pennsylvania Hotel

SYMPOSIUM ON HEAVY METALS

Precision Methods for the Evaluation of the Toxic Metals. LAWRENCE T. FAIRHALL, PH.D.

Mercury Poisoning from the Public Health Viewpoint. PAUL A. NEAL, M.D.

Lead Absorption, Lead Excretion and Lead Poisoning. ROBERT A. KEHOE, M.D.

Personal Protective Devices for Preventing Exposure to Heavy Metal Dusts and Fumes. WILLIAM P. YANT.

MENTAL HYGIENE

Special Session—North Ball Room, New Yorker Hotel

Presiding: HAVEN EMERSON, M.D.

Mental Hygiene and the Health Department. ALLEN W. FREEMAN, M.D.

Is There an Epidemiology of Mental Disease? HENRY B. ELKIND, M.D.

An Experiment in Training Nurses to Help Mothers in Preventive Mental Hygiene. JULIUS LEVY, M.D.

Subject and speaker to be announced.

PUBLIC HEALTH ENGINEERING SECTION AND CONFERENCE OF STATE SANITARY ENGINEERS

Joint Session—Salle Moderne, Pennsylvania Hotel

Presiding: H. J. DARCEY, *Chairman,* Conference of State Sanitary Engineers.

Proposed Standards for Design and Sanitation of Bathing Places. (Report of the Joint Committee on Bathing Places.) *Chairman,* WARREN J. SCOTT.

Meeting Flood Emergencies More Effectively — Selected Experiences of 1937 as a Guide for the Future.

a. **Availability and Coördination of Federal Facilities to Expedite Emergency Sanitation Measures.** RALPH E. TARBETT.

b. **The Essentials of an Effective State Plan and Program of Activities for Flood Sanitation.** C. W. KLASSEN and ARTHUR P. MILLER, C.E.

Discussion. JOHN K. HOSKINS, C.E., and F. CLARKE DUGAN, C.E.

Progress Report of the Joint Committee on Summer Camps and Roadside Places. *Chairman,* CARL E. GREEN. (*To be presented in abstract.*)

Report of the Joint Committee on Milk Supply. *Chairman,* WALTER VON D. TIEDEMAN, M.C.E.

Announcements.

Tuesday, 9:30 A.M.

LABORATORY

First Session—South East Ball Room, Pennsylvania Hotel

Address of the Chairman. WILLIAM D. STOVALL, M.D.

Section Business.

PUBLIC HEALTH NURSES

First Session—Winter Garden, McAlpin Hotel

Section Business.

Reports of Committees.

CHILD HYGIENE

First Session—Roof Garden, Pennsylvania Hotel

Some Observations on the Use of Tests for Vitamin A Deficiencies. CARROLL E. PALMER, M.D., PH.D.

Heart Disease in Childhood. T. DUCKETT JONES, M.D.

Tuberculosis Among Children in Cattaraugus County, New York. J. H. KORNS, M.D.

State-wide Program of Oral Health. HOWARD B. METTEL, M.D., and MARY H. WESTFALL, D.D.S.

Tuesday, 12:30 P.M.

INDUSTRIAL HYGIENE

Luncheon Session—Green Room, McAlpin Hotel

PUBLIC HEALTH ASSOCIATION OF NEW YORK CITY

Pioneers' Luncheon—Governor Ball Room, Governor Clinton Hotel

Tuesday, 2:30 P.M.

FOOD AND NUTRITION

First Session—Parlor 1, Pennsylvania Hotel

Presiding: WALTER S. FRISBIE

Report of the Committee on Milk and Dairy Products. Ice Cream. *Chairman,* F. W. FABIAN, PH.D.

Special Health Values of the Soy Bean. J. H. KELLOGG, M.D.

Critical Evaluation of the Formal Titration Method for the Examination of Cream. MILTON E. PARKER.

Quality and Public Health Factors in Cream. J. A. KEENAN, PH.D.

The Present Status of the Vitamins in Milk. E. V. MCCOLLUM, PH.D.

Report of the Committee on Standard Methods of Vitamin D Bioassay of Milk. *Chairman,* HENRY T. SCOTT, PH.D.

Tuesday, 2:30 P.M.

PUBLIC HEALTH ENGINEERING

First Session—South East Ball Room, Pennsylvania Hotel

Rat Control Through the Medium of Rat Proofing. B. E. HOLSENDORF.

The Survival of E. Typhi in Sewage Treatment Processes. CARL E. GREEN.

Progress Report of the Committee on Waterways Pollution. *Chairman,* LOUIS F. WARRICK, CH.E. (*To be presented by title only.*)

Progress Report of the Committee on Shellfish. *Chairman,* L. M. FISHER, D.P.H. (*To be presented by title only.*)

Chloramine Disinfection of Salt Water Swimming Pools. LEWIS V. CARPENTER and LLOYD R. SETTER.

Discussion. ATTMORE E. GRIFFIN, PH.B.

Report of the Committee on Water Supply. *Chairman,* ARTHUR E. GORMAN.

LABORATORY

Second Session—North Ball Room, New Yorker Hotel

CANCER

The Development of Laboratory Service in the Control of Cancer. AUGUSTUS B. WADSWORTH, M.D.

The Training of Pathologists. F. W. HARTMAN, M.D.

Attempted Correlation Between a Few Intracellular Chemical Compounds and the Biology of Growth and Development. STANLEY P. REIMANN, M.D.

Subject and speaker to be announced.

Trends in Cancer Research. CLARENCE C. LITTLE, SC.D.

PUBLIC HEALTH EDUCATION

First Session—Ball Room, New Yorker Hotel

Health Education Exhibits. (Report of the Committee on Section Exhibits.) *Chairman,* EVART G. ROUTZAHN.

Evaluation of Public Health Education Methods. (Report of the Committee on Evaluation.) *Chairman,* BERTRAND BROWN.

PANEL DISCUSSION

Why Health Education? Panel Leader, W. FRANK WALKER, DR.P.H.

Panel Members:
C. M. DERRYBERRY, PH.D.
GEORGE T. PALMER, DR.P.H.
FRANK KIERNAN
BENJAMIN C. GRUENBERG, PH.D.
RAYMOND S. PATTERSON, PH.D.
EDWARD P. EHRICH

Tuesday, 2:30 P.M.

EPIDEMIOLOGY

First Session—Salle Moderne, Pennsylvania Hotel

Ten-Year Experience with 3-Dose Diphtheria Toxoid in Ontario. A. L. McKAY, M.D., and REGINALD P. HARDMAN, M.D., D.P.H.

Familial Aggregation of Infectious Disease. WADE H. FROST, M.D.

An Epidemic of Type I Pneumococcus Pneumonia at the Worcester State Hospital. WILSON G. SMILLIE, M.D., G. HAROLD WARNOCK, M.D., and HAROLD J. WHITE.

Necropsy Evidences on Relation of Smoky Atmosphere to Pneumonia. SAMUEL R. HAYTHORN, M.D., and HARRY B. MELLER.

NEWER RESPONSIBILITIES IN PUBLIC HEALTH ADMINISTRATION

Special Session—Roof Garden, Pennsylvania Hotel

The Control of Syphilis. GEORGE H. RAMSEY, M.D.

The Control of Cancer. HENRY D. CHADWICK, M.D.

Diabetes. CHARLES F. BOLDUAN, M.D.

Heart Disease. Speaker to be announced.

CHILD HYGIENE SECTION AND PUBLIC HEALTH NURSES

Joint Session—Banquet Room, Pennsylvania Hotel

Pregnancy Wastage. REGINA K. STIX, M.D., and DOROTHY G. WIEHL.

Stillbirths. ETHEL C. DUNHAM, M.D., EDWIN F. DAILY, M.D., CLARA E. HAYES, M.D., and ELIZABETH C. TANDY, D.Sc.

Maternity Care in Rural Areas by Public Health Nurses. HELEN A. BIGELOW, R.N.

Discussion.

THE AMERICAN ASSOCIATION OF STATE REGISTRATION EXECUTIVES

First Session—Winter Garden, McAlpin Hotel

History of the Association. W. J. V. DEACON, M.D.

Report on the Use of Special Stillbirth Forms. WALTER A. PLECKER, M.D.

Reports of Committees.

Business.

Tuesday, 6:30 P.M.

PUBLIC HEALTH EDUCATION

Buffet Supper—Roof Garden, Pennsylvania Hotel

Informal meeting without business, for members of the Section and Their Friends.

There will be a display of posters which are to be considered at the Clinic on Posters in the Friday session.

Tuesday, 8:00 P.M.

FIRST GENERAL SESSION

Auditorium, Manhattan Opera House

Invocation.

Addresses of Welcome.

Address. LIVINGSTON FARRAND, M.D.

Announcement of the Sedgwick Memorial Medal Award.

Reception to the President and the President-elect.

Dancing.

Wednesday, 9:30 A.M.

VITAL STATISTICS

Second Session—Salle Moderne, Pennsylvania Hotel

Report of the Committee on Accident Statistics. *Chairman,* ROBERT J. VANE.

Report of the Committee on Forms and Methods of Statistical Practice. *Chairman,* A. W. HEDRICH, SC.D.

Report of the Committee to Study Death Certification. *Chairman,* MARJORIE T. BELLOWS.

Report of the Committee on Residence Allocation. *Chairman,* A. W. HEDRICH, SC.D.

Registrars and Registrars. FRANCIS D. RHOADS.

The Homicide Situation in the United States. RICHARD N. WHITFIELD, M.D.

Section Business.

CHILD HYGIENE

Second Session—South East Ball Room, Pennsylvania Hotel

Mental Hygiene. Speaker to be selected.

Some Suggestions for a More Effective School Health Program. JOHN T. PHAIR, M.B., D.P.H.

Post-Graduate Education of Physicians in Obstetrics and Pediatrics. MYRON E. WEGMAN, M.D., and EDWIN F. DAILY, M.D.

Section Business.

Wednesday, 9:30 A.M.

LABORATORY

Third Session—Parlor 1, Pennsylvania Hotel

WATER AND SEWAGE

LABORATORY

Fourth Session—Parlor 2, Pennsylvania Hotel

Section Business.

Drinking Glass and Washwater Examination. ROSE L. EPNER.

Poliomyelitis. MAURICE BRODIE, M.D.

Subject to be submitted. MAJOR WESLEY C. COX, M.D.

Blood Chemistry. ELDON M. BOYD, M.D.

EPIDEMIOLOGY

Second Session—Roof Garden, Pennsylvania Hotel

Members of the Health Officers Section are invited to attend

Milk-Borne Streptococcus Infections. ERNEST L. STEBBINS, M.D., and HOLLIS S. INGRAHAM, M.D.

The Present Status of Scarlet Fever Prevention. GAYLORD W. ANDERSON, M.D.

Experiences in Scarlet Fever Control. EDWARD R. KRUMBIEGEL, M.D.

Scarlet Fever Immunization. EDWIN H. PLACE, M.D., and GEORGE P. SANBORN, M.D.

The Prophylactic Use of Convalescent Serum in Scarlet Fever. MAURICE HARDGROVE, M.D.

INDUSTRIAL HYGIENE SECTION, PUBLIC HEALTH NURSES, AND NATIONAL SOCIETY FOR THE PREVENTION OF BLINDNESS

Joint Session—Banquet Room, Pennsylvania Hotel

SYPHILIS CONTROL IN INDUSTRY AND INDUSTRIAL DERMATOSES

Presiding: LEVERETT D. BRISTOL, M.D., DR.P.H.

Syphilis Control in Industry. R. R. SAYERS, M.D.

The Role of the Public Health Nurse in Syphilis Control. GLADYS CRAIN.

The Diagnosis of Industrial Skin Diseases. LOUIS SCHWARTZ, M.D.

The Role of Allergy in Industrial Dermatoses. MARION SULZBERGER, M.D.

Syphilis of the Eye as a Factor in Industry. Speaker to be announced.

Wednesday, 12:30 P.M.

FOOD AND NUTRITION

Luncheon Session—Salle Moderne, Pennsylvania Hotel

PUBLIC HEALTH NURSES

Luncheon Session—Governor Ball Room, Governor Clinton Hotel

Report on the National Organization of Public Health Nursing Study of Personnel Practices for Public Health Nurses in Official Agencies. MARIAN G. RANDALL.

PUBLIC HEALTH EDUCATION

Luncheon Session—Ball Room, McAlpin Hotel

Public Relations for Public Health. Speaker to be announced.

BUSINESS ASPECTS OF THE HEALTH DEPARTMENT

Luncheon Session—Green Room, McAlpin Hotel

DELTA OMEGA

Luncheon Session—Winter Garden, McAlpin Hotel

Wednesday, 2:30 P.M.

LABORATORY

Fifth Session—South East Ball Room, Pennsylvania Hotel

VIRUS DISEASES

Virus Diseases and Their Importance and the Public Health. WILBUR A. SAWYER, M.D.

Production and Use of Smallpox Vaccine Virus Cultivated in the Chorioallantoic Membrane of Chick Embryos. G. JOHN BUDDINGH, M.D.

Experiments on Antirabic Vaccination with Tissue Culture Virus. LESLIE T. WEBSTER, M.D.

Lymphocyctic Chorio-meningitis. THOMAS M. RIVERS, M.D.

Influenza. THOMAS FRANCIS, JR., M.D.

Discussion. HANS ZINSSER, M.D., SC.D.

LABORATORY AND FOOD AND NUTRITION SECTIONS

Joint Session—Parlor 1, Pennsylvania Hotel

DAIRY AND FOOD PRODUCTS

Presiding: ROBERT S. BREED, PH.D.

Wednesday, 2:30 P.M.

PUBLIC HEALTH ENGINEERING

Second Session—North Ball Room, New Yorker Hotel

Sanitary Aspects of Air Conditioning. CONSTANTIN P. YAGLOU.

Sanitary Ventilation. WILLIAM F. WELLS.

Summary of Studies of Air Bacteria with Particular Reference to Streptococci in New York Schools, Subways, Cars, Streets, and a Park. LEON BUCHBINDER, PH.D.

Report of the Joint Committee on Plumbing. *Chairman,* JOEL I. CONNOLLY.

Progress Report of the Committee on Industrial Sanitation. *Chairman,* CHARLES L. POOL. (*To be presented by title only.*)

Present Status of the Phosphatase Test for Pasteurized Milk. WALTER VON D. TIEDEMAN, M.C.E.

Discussion. PAUL F. KRUEGER.

Section Business.

PUBLIC HEALTH EDUCATION

Second Session—Banquet Room, Pennsylvania Hotel

Section Business.

Results of Mass Education for Tuberculosis Prevention in Detroit. HENRY F. VAUGHAN, DR.P.H.

Visual Education for Schools. PAULINE B. WILLIAMSON.

New Program of the National Education Association. EDNA W. BAILEY, PH.D.

Progress in School Health Education. (Report from the Seventh Biennial Health Section, World Federation of Education Associations' Conference, Tokyo, Japan.) Secretary, SALLY LUCAS JEAN.

The Health Education Institute. (Report of the Committee on Health Education Institute.) *Chairman,* IRA V. HISCOCK.

Relations with Child Hygiene Section. (Report of the Committee on Relations with the Child Hygiene Section.) *Chairman,* CLAIR E. TURNER, DR.P.H.

FOOD AND NUTRITION

Second Session—Salle Moderne, Pennsylvania Hotel

Presiding: WALTER S. FRISBIE

Report of the Committee on Foods. *Chairman,* ALBERT C. HUNTER, PH.D.

Food Allergy from the Medical Viewpoint. Speaker to be announced.

Food Allergy from the Chemical Viewpoint. HENRY STEVENS, PH.D.

The Federal Food and Drugs Act and its Health Aspects. WILLIAM G. CAMPBELL.

Sanitation and Quality Control in the Fishery Industries. GERALD A. FITZGERALD.

Present Status of the Spray Residue Problem. Speaker to be announced.

Wednesday, 2:30 P.M.

PUBLIC HEALTH ADVANCING

Special Session—Roof Garden, Pennsylvania Hotel

Historical Developments from 1860 to 1872, Preceding the Establishment of the American Public Health Association. PROFESSOR RICHARD H. SHRYOCK.

International Coöperation in Hygiene. FRANK G. BOUDREAU, M.D.

Recent Advances in the Field of Public Health Nursing. ELIZABETH G. FOX, R.N.

Subject and speaker to be announced.

THE AMERICAN ASSOCIATION OF STATE REGISTRATION EXECUTIVES

Second Session—Parlor 2, Pennsylvania Hotel

Revision of Birth, Death and Stillbirth Certificates. W. FRANK WALKER, DR.P.H.

Discussion by Representatives of the U. S. Children's Bureau, the U. S. Census Bureau, the U. S. Public Health Service, Insurance Companies, and Members in General.

Wednesday, 6:30 P.M.

VITAL STATISTICS

Dinner Session—Winter Garden, McAlpin Hotel

Plans for Special Studies During 1940 Census Period. Official and non-official agencies.

Presiding: S. A. STOUFFER, PH.D.

PUBLIC HEALTH ENGINEERING AND CONFERENCE OF STATE SANITARY ENGINEERS

Annual Engineers' Stag Dinner—Roof Garden, Pennsylvania Hotel

WILLIAM J. ORCHARD, *Toastmaster.*

ASSOCIATION OF WOMEN IN PUBLIC HEALTH

Dinner Session—Ball Room, McAlpin Hotel

Thursday, 9:30 A.M.

PUBLIC HEALTH ENGINEERING

Third Session—Winter Garden, McAlpin Hotel

SYMPOSIUM ON SANITARY INSPECTION ACTIVITIES AND PROBLEMS

Oyster Control Measures from a Public Health Standpoint. MILTON H. BIDWELL.

Problems in Elimination of Sub-Standard Housing. DENNIS E. DUFFY.

The Control of Nuisances. EDWARD WRIGHT.

Supervision of Fumigation and Extermination. JOHN OBERWAGER, M.D.

Supervision of Food in New York City. ABRAHAM LICHTERMAN, PHAR.D.

Thursday, 9:30 A.M.

HEALTH OFFICERS

Second Session—Auditorium, Manhattan Opera House

WHAT EVERY HEALTH OFFICER SHOULD KNOW

TEN MINUTE TALKS BY REPRESENTATIVES OF OTHER SECTIONS ON DEVELOPMENTS IN THEIR SPECIAL FIELDS

Laboratory Section. WILLIAM D. STOVALL, M.D.

Vital Statistics Section. L. W. HUTCHCROFT.

Public Health Engineering Section. Representative to be announced.

Industrial Hygiene Section. LEVERETT D. BRISTOL, M.D., DR.P.H.

Food and Nutrition Section. FRED W. TANNER, PH.D.

Child Hygiene Section. Representative to be announced.

Public Health Education Section. MARY P. CONNOLLY.

Public Health Nursing Section. Representative to be announced.

Epidemiology Section. Representative to be announced.

Section Business.

LABORATORY

Sixth Session—North Ball Room, New Yorker Hotel

TUBERCULOSIS

Laboratory Methods for the Diagnosis of Early Tuberculosis. MAZÝCK P. RAVENEL, M.D.

Laboratory Test for Tuberculosis in Animals. C. R. SCHROEDER, D.V.M.

The Accurate Standardization of Diluted Tuberculin. WILLIAM E. BUNNEY, PH.D.

A Comparative Study of the Various Culture Media for the Primary Isolation of Tubercle Bacilli. A. L. MACNABB, D.V.M.

Title and speaker to be announced.

CHILD HYGIENE SECTION AND PUBLIC HEALTH NURSES

Joint Session—Roof Garden, Pennsylvania Hotel

THE CRIPPLED CHILD

Development of the Federal Program for the Care of Crippled Children. ROBERT C. HOOD, M.D.

Preventive Aspects of Crippling Diseases. H. E. HILLEBOE, M.D.

The Public Health Nurse and Orthopedic Nursing Care. DOROTHY J. CARTER, R.N.

Social Work and the Handicapped Child. DOROTHY BUCKNER.

Education of the Handicapped Child. BRONSON CROTHERS, M.D.

Thursday, 9:30 A.M.

FOOD AND NUTRITION

Third Session—Parlor 2, Pennsylvania Hotel

Presiding: WALTER S. FRISBIE

Report of the Committee on Microbiological Methods of Food Examination. *Chairman,* LAWRENCE H. JAMES, PH.D.

Diet and Resistance to Infection and the Effect of the Maternal Diet. CHARLES F. CHURCH, M.D.

What Do We Know About Nutritional Dental Caries? BION R. EAST, D.D.S.

Nutritional Influence on Teeth. FRANCES KRASNOW, PH.D.

Chemical Literature Suggesting the Extent of Incipient Vitamin Deficiency in the United States. (Report of the Committee on Nutritional Problems.) *Chairman,* D. BREESE JONES, PH.D.

Organization and Activity in Nutrition in the Ministry of Public Health of Uruguay. JUSTO F. GONZALEZ, M.D.

INDUSTRIAL HYGIENE

Second Session—Parlor 1, Pennsylvania Hotel

Address of the Chairman. Vaccines Against the Common Cold — Are They of Value in the Industrial Health Program? LEVERETT D. BRISTOL, M.D., DR.P.H.

The Lung Findings in Foundry Workers — A Four-Year Survey. O. A. SANDER, M.D.

The Development of an Industrial Hygiene Program in a State Health Department. HERMAN F. EASOM, M.D., and M. F. TRICE.

Diagnosing and Curing the Accident Habit. CHARLES S. SLOCOMBE.

Discussion.

Four Years' Experience with the Industrial Hygiene Appraisal Form. E. L. SIMONDS and E. R. DEJON.

VITAL STATISTICS SECTION AND THE AMERICAN ASSOCIATION OF STATE REGISTRATION EXECUTIVES

Joint Session—Ball Room, McAlpin Hotel

Presiding: J. F. BLACKERBY.

Vital Statistics from a Legal Viewpoint. JOHN S. STRAHORN, JR., LL.B., S.J.D.

What Is a Delayed Certificate and Under What Conditions and Requirements Should It Be Filed? FRANKLIN H. REEDER, JR., M.D.

What Social Security Needs Will Be from State Bureaus of Vital Statistics. EWAN CLAGUE, PH.D.

Accuracy of Cancer Death Records. ELEANOR J. MACDONALD.

Thursday, 9:30 A.M.

PUBLIC HEALTH ENGINEERING AND EPIDEMIOLOGY SECTIONS

Joint Session—Banquet Room, Pennsylvania Hotel

SYMPOSIUM ON EXPLOSIVE OUTBREAKS OF GASTROINTESTINAL DISORDERS WITH PARTICULAR REFERENCE TO TRANSMISSION BY WATER SUPPLIES AND METHODS OF STUDY AND PREVENTION

Presiding: GORDON M. FAIR, and CLARENCE L. SCAMMAN, M.D.

Apparent Prevalence and Engineernig Aspects of Such Outbreaks. JACK J. HINMAN, JR.

Discussion. ANSELMO F. DAPPERT.

Gastrointestinal Disturbances of Obscure Origin. ALBERT V. HARDY, M.D.

Discussion. MILTON V. VELDEE, M.D.

Study of a Water-borne Outbreak of Gastrointestinal Disorders in a Tennessee Town. W. CARTER WILLIAMS, M.D., CRIT PHARRIS, M.D., and FRANCIS W. KITTRELL.

Epidemiological and Laboratory Studies of an Outbreak of Gastrointestinal Disorder Not Proved to be Water-borne. D. GORDON GILL, M.B., D.P.H., JAMES G. MCALPINE, PH.D.

Discussion. CHARLES D. BOWDOIN, M.D.

Thursday, 12:30 P.M.

PUBLIC HEALTH EDUCATION

Luncheon Session—South East Ball Room, Pennsylvania Hotel

The Box-Office Appeal of Health Movies. Speaker to be announced.

PROFESSIONAL EDUCATION

Special Luncheon—Salle Moderne, Pennsylvania Hotel

Presiding: W. S. LEATHERS, M.D., *Chairman of the Committee.*

Certain Criteria in the Qualifications and Preparation of Health Officers. HENRY E. MELENEY, M.D.

Preparing the Nurse to Meet Community Needs in Public Health. MARION G. HOWELL, R.N.

Thursday, 4:30 P.M.

NATIONAL ORGANIZATION FOR PUBLIC HEALTH NURSING, COURSE DIRECTORS

Parlor 1, Pennsylvania Hotel

Thursday, 7:00 P.M.

SECOND GENERAL SESSION

Banquet—Roof Garden, Pennsylvania Hotel

Address of the President-elect. ARTHUR T. MCCORMACK, M.D.

Presentation of Certificate to G. Everett Hill.

Announcement of Health Conservation Contest Awards.

Dancing.

Friday, 9:30 A.M.

HEALTH OFFICERS

Third Session—South East Ball Room, Pennsylvania Hotel

Politics in the Selection of Municipal Health Department Personnel, Is There a Remedy? WILLIAM PARR CAPES.

The Qualifications of a Venereal Disease Control Officer. THOMAS B. TURNER, M.D.

Is the Routine Examination and Certification of Food Handlers Worthwhile? WILLIAM H. BEST, M.D.

Health Implications in Disasters. WILLIAM DEKLEINE, M.D.

PUBLIC HEALTH EDUCATION

Third Session—Banquet Room, Pennsylvania Hotel

Section Objectives. (Report of the Committee on Objectives.) *Chairman,* IAGO GALDSTON, M.D.

Publications for Health Education. (Report of the Committee on Publications.) *Chairman,* CARL A. WILZBACH, M.D.

Window Displays for Health Education. POLLY PETTIT.

Clinic on Printed Matter.
Critic on Content — LEON WHIPPLE.
Clinic on Posters.
Clinic Leader — AUBYN CHINN.

EPIDEMIOLOGY

Third Session—Winter Garden, McAlpin Hotel

Measles. FRANKLIN H. TOP, M.D.

The Epidemiology of Trichinosis. CLARENCE D. BARRETT, M.D., and RICHARD SEARS, M.D.

Epidemic Diarrhea of the New-Born: Epidemiologic Features of Highly Fatal Diarrhea Among New-Born Infants in Hospital Nurseries. SAMUEL FRANT, M.D., and HAROLD ABRAMSON, M.D.

The Investigation of Early Syphilis. WILLIAM T. CLARK, M.D., and CLEALAND A. SARGENT, M.D.

Friday, 9:30 A.M.

LABORATORY

Seventh Session—Salle Moderne, Pennsylvania Hotel

Typhus as a Causal Factor in Thrombo-angiitis Obliterans. CHARLES GOODMAN, M.D.

Difficulties Encountered in Pneumococcal Type Determination. ANNABEL W. WALTER.

A Simple Revised Technic of Actinic Sunshine Analysis with Modifications for Freezing Weather and Near Meridian Exposures. FRED O. TONNEY, M.D.

The Cultivation of H. ducreyi and the Use of Bacillary Antigen for Intracutaneous Tests in the Recognition of Chancroidal Infection. EVERETT S. SANDERSON, PH.D., and R. W. GREENBLATT, M.D.

HYGIENE OF HOUSING

Special Session—North Ball Room, New Yorker Hotel

Air Conditioning. C.-E. A. WINSLOW, DR.P.H., *Chairman,* Committee on Hygiene of Housing.

Housing Survey. ROLLO H. BRITTEN.

Plumbing. JOEL I. CONNOLLY.

Sociology. PROFESSOR F. STUART CHAPIN.

Construction Methods. ROBERT L. DAVISON.

Town Planning. PROFESSOR JAMES FORD.

Architecture. J. ANDRE FOUILHOUX.

Home Economics. PROFESSOR GRETA GRAY.

Public Housing. H. A. GRAY.

Lighting. JAMES E. IVES, PH.D.

Home Safety. DR. M. G. LLOYD.

Sanitary Engineering. HAROLD A. WHITTAKER.

VITAL STATISTICS SECTION AND BIOMETRIC SECTION, AMERICAN STATISTICAL ASSOCIATION

Joint Session—Ball Room, McAlpin Hotel

Presiding: LOWELL J. REED, PH.D.

Some Effects on Our Vital Statistics of an Individual Check of Registration Against a Census Record. LOWELL J. REED, PH.D.

Problems of the Next Census. LEON E. TRUESDELL, PH.D.

Determining Population in Intercensal Years by Means of Continuous Population Registers. DOROTHY S. THOMAS.

Methods of Estimating Postcensal Populations. HENRY S. SHRYOCK.

Friday, 9:30 A.M.

FOOD AND NUTRITION AND CHILD HYGIENE SECTIONS, AND PUBLIC HEALTH NURSES

Joint Session—Auditorium, Manhattan Opera House

Presiding: BERNARD E. PROCTOR, PH.D., and AMOS L. PEAGHLER, M.D.

Nutrition Program in a State Health Department. WOODBRIDGE E. MORRIS, M.D.

Nutrition in Maternal and Child Health Programs under the Social Security Act. MARJORIE M. HESSELTINE.

Nutritional Education in the Home. The Dutchess Couny, New York, Project. BERTRAND E. ROBERTS, M.D.

The Nutritionist in the City Public Health Program. SOPHIA S. HALSTED.

Education in Nutrition by Private Agencies. JAMES A. TOBEY, DR.P.H.

Discussion. HENRY C. SHERMAN, PH.D.

PUBLIC HEALTH ENGINEERING SECTION AND FEDERATION OF SEWAGE WORKS ASSOCIATIONS

Joint Session—Roof Garden, Pennsylvania Hotel

Presiding: CHARLES A. EMERSON, JR., *Chairman,* Federation of Sewage Works Associations.

The Effects of Industrial Wastes on Sewage Treatment. ALMON L. FALES.

Discussion. ARTHUR D. WESTON.

A Survey of Recent Developments in the Treatment of Industrial Wastes. WILLEM RUDOLFS, PH.D.

Discussion. CHARLES R. HOOVER, PH.D.

The Practical Methods of Preventing Dairy Waste Nuisances. H. A. TREBLER, CH.E., ENG.D.

Discussion. CHARLES C. AGAR.

The Value of Sewage Sludge as a Fertilizer. (Report of the Committee on Sewage Disposal.) *Chairman,* LANDON PEARSE.

Friday, 12:30 P.M.

DIPHTHERIA IMMUNIZATION

Special Luncheon—Governor Ball Room, Governor Clinton Hotel

Preliminary Report of the Diphtheria Immunization Committee.

DONALD T. FRASER, M.B., D.P.H.
WILLIAM E. BUNNEY, PH.D.
EDWARD S. GODFREY, JR., M.D.
WILLIAM T. HARRISON, M.D.
G. FOARD MCGINNES, M.D.
WILLIAM H. PARK, M.D.
V. K. VOLK, M.D.

Friday, 12:30 P.M.

NATIONAL COMMITTEE OF HEALTH COUNCIL EXECUTIVES

Parlor B, Hotel Pennsylvania

Friday, 2:30 P.M.

PUBLIC MEETING

Special Session—Auditorium, Manhattan Opera House.

Presiding: ARTHUR T. MCCORMACK, M.D.

The Social Significance of the Health Center. HOMER FOLKS.

Individual Preventive Medicine. IAGO GALDSTON, M.D.

Subject and speaker to be announced.

Subject and speaker to be announced.

CHILD HYGIENE SECTION, PUBLIC HEALTH NURSES, AND AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

Joint Session—Banquet Room, Pennsylvania Hotel

Practical Procedures in School Health Service. DOROTHY B. NYSWANDER, PH.D.

Discussion. AMELIA GRANT, R.N.

The Extent of Seasonal Variation of Intermittency in Growth. CLAIR E. TURNER, DR.P.H.

Health Knowledge of School Children with Reference to Health Education. MAX SEHAM, M.D.

Discussion.

THE AMERICAN ASSOCIATION OF STATE REGISTRATION EXECUTIVES

Third Session—Parlor 1, Pennsylvania Hotel

Round Table.

Why Declining Birth Rates? IRVA C. PLUMMER.

Interstate Recognition of Transit Permits. A. W. HEDRICH, SC.D.

How Best Compute Stillbirth and Maternal Death Rates? L. W. HUCHCROFT.

How Can the U. S. Census Bureau Extend Aid to States in Promoting Completeness and Accuracy of Registration? ROBERT L. MCLAREN.

Office Organization to Conserve Time of Director. HARRIET I. PARKHURST.

LABORATORY

Eighth Session—South East Ball Room, Pennsylvania Hotel

VETERINARY PHASES OF PUBLIC HEALTH

MEETINGS OF OTHER ORGANIZATIONS

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

Friday, 2:30 P.M. Joint Session with Child Hygiene Section and Public Health Nurses. *Banquet Room, Pennsylvania Hotel.* (See page 18.)

ASSOCIATION OF WOMEN IN PUBLIC HEALTH

Wednesday, 6:30 P. M. Dinner. *Ball Room, McAlpin Hotel.*

THE AMERICAN ASSOCIATION OF STATE REGISTRATION EXECUTIVES

Tuesday, 2:30 P.M. Winter Garden, McAlpin Hotel. (See page 6.)

Wednesday, 2:30 P.M. Colonial Room, McAlpin Hotel. (See page 11.)

Thursday, 9:30 A.M. Joint Session with Vital Statistics Section. *Ball Room, McAlpin Hotel.* (See page 13.)

Friday, 2:30 P.M. Winter Garden, McAlpin Hotel. (See page 18.)

BIOMETRIC SECTION, AMERICAN STATISTICAL ASSOCIATION

Friday, 9:30 A.M. Joint Session with Vital Statistics Section. *Ball Room, McAlpin Hotel.* (See page 16.)

BUSINESS ASPECTS OF THE HEALTH DEPARTMENT

Wednesday, 12:30 P.M. Luncheon. *Green Room, McAlpin Hotel.*

CONFERENCE OF STATE SANITARY ENGINEERS

Tuesday, 9:30 A.M. Joint Session with Public Health Engineering Section. *Salle Moderne, Pennsylvania Hotel.* (See page 3.)

Wednesday, 6:30 P.M. Annual Engineers' Stag Dinner. *Roof Garden, Pennsylvania Hotel.* (See page 11.)

DELTA OMEGA

Wednesday, 12:30 P.M. Luncheon. *Winter Garden, McAlpin Hotel.*

FEDERATION OF SEWAGE WORKS ASSOCIATIONS

Friday, 9:30 A.M. Joint Session with Public Health Engineering Section. *Roof Garden, Pennsylvania Hotel.* (See page 17.)

NATIONAL ORGANIZATION FOR PUBLIC HEALTH NURSES, COURSE DIRECTORS

Thursday, 4:30 P.M. Parlor 1, Pennsylvania Hotel.

NATIONAL SOCIETY FOR THE PREVENTION OF BLINDNESS

Wednesday, 9:30 A.M. Joint Session with Industrial Hygiene Section and Public Health Nurses. *Banquet Room, Pennsylvania Hotel.* (See page 8.)

PUBLIC HEALTH ASSOCIATION OF NEW YORK CITY

Tuesday, 12:30 P.M. Pioneers' Luncheon—*Governor Ball Room, Governor Clinton Hotel.*

RAILROAD FARES FROM VARIOUS POINTS TO NEW YORK

AMERICAN PUBLIC HEALTH ASSOCIATION
OCTOBER 5–8, 1937

From	*One-way Pullman Travel*	*Round-trip for Pullman Travel*	*One-way Lower*	*One-way Upper*
Atlanta, Ga.	$29.95	$39.15 (2)	$6.50	$5.20
Baltimore, Md.	5.60	11.20 (1)	2.50	2.00
Boston, Mass.	6.90	13.80 (1)	2.50	2.00
Buffalo, N. Y.	13.10	26.20 (1)	2.50	2.00
Chicago, Ill.	27.25	54.50 (1)	6.00	4.80
Cincinnati, O.	22.55	45.10 (1)	5.00	4.00
Cleveland, O.	17.15	34.30 (1)	3.75	3.00
Dallas, Tex.	47.62	67.25 (2)	11.75	9.40
Denver, Colo.	58.31	87.90 (4)	13.25	10.60
Detroit, Mich.	21.50	43.00 (1)	4.25	3.40
Duluth, Minn.	40.92	72.75 (4)	8.50	6.80
Fort Worth, Tex.	48.51	68.50 (2)	11.75	9.40
Indianapolis, Ind.	24.35	48.70 (1)	6.00	4.80
Jacksonville, Fla.	30.50	45.20 (2)	7.25	5.80
Kansas City, Mo.	40.08	68.20 (4)	9.00	7.20
Louisville, Ky.	26.10	49.90 (2)	6.00	4.80
Los Angeles, Calif.	90.36	134.50 (5)	21.75	17.40
Memphis, Tenn.	33.58	50.90 (2)	8.50	6.80
Milwaukee, Wis.	29.80	57.90 (4)	6.00-b	4.80-b
Minneapolis, Minn.	39.46	70.80 (4)	8.50	6.80
Nashville, Tenn.	28.57	42.70 (2)	6.75	5.40
New Orleans, La.	40.30	58.30 (2)	9.75	7.80
Omaha, Nebr.	42.19	74.45 (4)	9.00	7.20
Philadelphia, Pa.	2.70	5.40 (1)	2.00	1.60
Pittsburgh, Pa.	13.20	26.40 (1)	3.00	2.40
Portland, Ore.	89.59	134.50 (5)	21.75	17.40
Salt Lake City, Utah	72.04	108.85 (5)	16.25	13.00
San Francisco, Calif.	90.36	134.50 (5)	21.75	17.40
Seattle, Wash.	89.59	134.50 (5)	21.75	17.40
St. Louis, Mo.	31.75	63.50 (1)	7.25	5.80
Washington, D. C.	6.80	13.60 (1)	2.50	2.00
Montreal, Que.	12.05	24.10 (1)	2.50	2.00
Halifax, N. S.	28.55	52.85 (5)	7.00	5.60
Ottawa, Ont.	14.80	29.60 (1)	2.50-a	2.00-a
Quebec, P. Q.	16.60	32.05 (5)	2.50-a	2.00-a
Toronto, Ont.	15.70	31.40 (1)	3.00	2.40
Vancouver, B. C.	89.59	134.50 (5)	21.75	17.40

a—Montreal-New York
b—From Chicago

(1) Double One-way Fare
(2) 15-day Excursion
(4) 30-day Excursion
(5) Season Limit Summer Tourist

NOTE: Some of the season limit fares must be used leaving starting point not later than September 30. Consult your local ticket agent.